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VIEWS, NEWS AND INTERVIEWS.

"Have you realized the importance of the date, October 12?" inquired a well-informed electrical man. "On that day, in 1492, Columbus discovered America, which is why we have the World's Fair. St. Anthony, was born on October 12. You have seen his pictures, no doubt. Mr. Charles R. Huntley, ex-president of the National Electric Light Association and general manager of the General Electric Company, of Buffalo N. Y., also claims October 12 as his natal day. To cap the climax and make the calendar complete, Mr. Cyrus O. Baker, Jr., the head of the great platinum house of Baker & Company, of Newark, N. J., was born on this day, which is what reminds me that your calendar should be marked in red on October 12."

The first electric car line in Arizona went into operation in Phœnix last week, and is a complete success in its operation.

"I read some time ago that signs projected by electric search-lights on the clouds over London would be a novel advertising idea," said an electrical engineer. "I've got a better one than that. Why not place electric search lights on the Canadian side of Niagara Falls and project advertising announcements on the American Falls? The immense curtain of water would make a splendid background and the rapidly falling water would produce novel effects on the signs. The trolley road now operating along the Falls might utilize this scheme and give its patrons gigantic magic lantern shows on summer evenings."

Three masked men held up an electric car at Des Moines, Ia., the other night and robbed the conductor of $4 and a watch.

A drunken painter named Tucker gave a war dance on the narrow platform at the top of a telephone pole 90 feet above the ground, at Atlanta Ga., one day last week. He carried up a flask of whiskey and a can of green paint. With the paint he colored himself green from belt to crown. Then he sang and yelled and danced, attracting a great crowd.

He swung himself from the right of the platform and dangled there in the air to the horrow of the crowd below. Two linemen were telephoned for and climbed up. One got through the trap door when Tucker shut it and would not let the other up. He assaulted the lineman on the platform and they had a thrilling fight. Tucker tried to throw the lineman off, but the latter finally got in a blow with his nippers on Tucker's head, knocking him senseless. Tucker was then let down with a rope and taken to the police station. It seems that Georgia whiskey induces a man to paint things green, while Jersey "lightning" is known to give one a liking for the complementary color, red.

The Kennelly Patent Standard Electrostatic Voltmeter.

This instrument is intended for use in central stations, and to be secured permanently in an upright position against wall or switchboard. It can be used on either continuous or alternating current circuits, and is made in two sizes indicating up to 600 and 1,150 volts respectively.

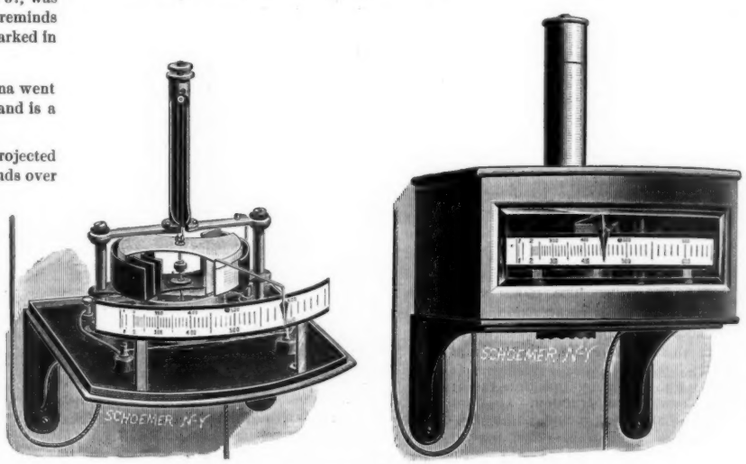
The instrument, represented in the accompanying figure, is very simple in design, and acting entirely on electrostatic principles, takes no current. A horizontal aluminium vane is suspended bifilarly, and carries vertical sectors of the same metal, which travel freely in curved brass grooves. The vane and sectors are electrically connected through the suspension wires with one side of the circuit, and the brass grooves with the other, so that the electro-motive force sets up an electro-static attraction between these parts, and the sectors enter the grooves, twisting the suspension wires until arrested by gravitational force. The vane and sectors carry a horizontal pointer of six inches radius over the curved face of a scale eight inches long, and the index points to the electro-motive force supplied to the instrument terminals. On the scale of the 600-volt instrument intended for use on 500-volt circuits, a variation of five volts or one per cent. at load, makes a change of about one-eighth of an inch.

As the vane and grooves are connected directly across the bus bars, any accidental metallic contact between them would produce a short circuit. To prevent this the walls of the grooves are heavily japanned, so that contact with the vane allows no spark to pass. As an additional security a fuse of fine wire is added within the case.

The vane suspension terminates beneath in a light metallic damper immersed in non-evaporating oil, so that the movements of the pointer are practically deadbeat.

As the instrument simply measures electro static force against gravity, there is nothing within its action liable to change with time, and there are no pivots to introduce friction. The advantage of a bifilar suspension is its independence of torsion, and such errors as temperature or elastic fatigue in wires are capable of producing.

The base and frame of the instrument are of cast-iron, the cover of polished wood, and the front of bevelled glass. The instrument is a handsome ornament to a switchboard. Its height above base is 11 inches, breadth 14½ inches, and projection from the wall 13 inches. It is unaffected by magnetic fields or temperature, moderate vibration or belt electrification. It has undergone satisfactory trials during the past 18 months. The instrument is manufactured by the Edison Manufacturing Company, of 110 East Twenty-third street, New York City.



THE KENNELLY STANDARD ELECTROSTATIC VOLTMETER.

American Institute of Electrical Engineers.

The American Institute of Electrical Engineers has issued its annual, containing a brief history of the organization, lists of officers and committees and the names of past officers. The membership roll, corrected to June 1, 1893, shows a total of 690, of which two are honorary, 212 members and 476 associate members.

LITERARY.

"Proceedings of the United States Naval Institute," Vol. XIX, No. 3, has been received.

The Chicago *Daily Inter-Ocean* for October 9, fittingly celebrated Chicago Day at the World's Fair, by issuing a very handsome paper containing colored supplements of great merit illustrating the growth of Chicago.

THE STREET RAILWAY CONVENTION.

THE ANNUAL MEETING IN SESSION AT MILWAUKEE THIS WEEK.

The twelfth annual meeting of the American Street Railway Association is in session at Milwaukee this week and promises to be a most successful gathering. The days appointed for holding the meetings are Wednesday, Thursday and Friday. The annual dinner is to be held Thursday evening at the Plankinton House.

Milwaukee is a beautiful city of 260,000 inhabitants, and contains some fine examples of electric railway construction and operation. The handsome Exposition Building has been secured as a meeting place for the convention, and there is also an interesting exhibit of street railway supplies under the same roof. The headquarters of the Association are at the Plankinton House, one of Milwaukee's finest hotels.

The Lewis & Fowler Manufacturing Company, of Brooklyn, N. Y., in accordance with their usual custom, arranged for special transportation on one of the Pennsylvania Railroad's fast trains, in which they transported a party of 15 from New York to Milwaukee. Another party, under the direction of Mr. J. H. McGraw, of the *Street Railway Journal*, left New York in special cars over the New York Central Railroad last Friday.

Among the manufacturing and supply houses who will have exhibits and representatives at the convention are the following:

Standard Railway Supply Co., Chicago, Ill.
American Fluoride Co., New York.
Baltimore Car Wheel Co., Baltimore, Md.
New Process Raw Hide Co., Syracuse, N. Y.
Dorner & Dutton, Cleveland, O.
Short Electric Railway Co., Cleveland, O.
Sperry Electric Railway Co., New York.
General Electric Co., New York.
Wadham's Oil and Grease Co., Milwaukee, Wis.
Fitzgerald-Van Dorn Co., Lincoln, Neb.
Peckham Motor Truck and Wheel Co., Kingston, N. Y.
Eureka Tempered Copper Co., North East, Pa.
Fulton Foundry Co., Cleveland, O.
Automatic Car Brake Co., Grand Rapids, Mich.
Smith Friction Tool Co., Boston, Mass.
J. G. Brill Co., Philadelphia, Pa.
Siemens & Halske, Chicago, Ill.
Stanwood Manufacturing Co., Chicago, Ill.
Rochester Car Wheel Co., Rochester, N.Y.
National Electric Manufacturing Co., Eau Claire, Wis.
E. F. DeWitt & Co., Lansingburgh, N.Y.
Meaker Manufacturing Co., Chicago, Ill.
Graham Equipment Co., Boston, Mass.
Jewell Belting Co., Hartford, Conn.
Sterling Supply Co., New York.
Time Transfer Printer Manufacturing Co., Pittsburgh, Pa.
International Register Co., Chicago, Ill.
St. Louis Car Co., St. Louis, Mo.
John M. Christopher, Baltimore, Md.
Pennsylvania Steel Co., Steelton, Pa.

Western Electric Co., Chicago, Ill.
Pinkham Car Track Sander Co., Boston, Mass.
Pawtucket Brass Foundry, Pawtucket, R. I.
Western Electric Heating Co., Chicago, Ill.
Keller Printing Co., New York.
Burrowes Car Shade Co., Portland, Me.
H. W. Johns Manufacturing Co., New York.
Paige Iron Works, Chicago, Ill.
Safety Brake Shoe Co., Boston, Mass.
Jones & Laughlins, Pittsburgh, Pa.
Charles A. Schieren & Co., Pittsburgh, Pa.
Cudahy Lubricating Co., Milwaukee, Wis.
Davis Car Shade Co., Portland, Me.
Miamisburg Electric Co., Miamisburg, O.
Curtis Electric Manufacturing Co., Jersey City, N. J.
Cutter Electrical and Manufacturing Co., Philadelphia, Pa.
Mica Insulator Co., New York.
National Lock Washer Co., Newark, N.J

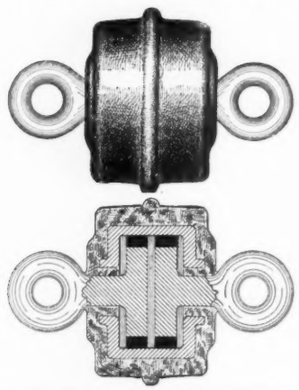


FIG. 1.—H. W. JOHNS MANUFACTURING COMPANY'S "GIANT" STRAIN INSULATOR.

Charles Sidney Smith, Spokane, Wash.
William R. Pitt Composite Iron Works, New York.
George H. Graham, Chicago, Ill.
Standard Underground Cable Co., Pittsburgh, Pa.
R. A. Crawford Manufacturing Co., Pittsburgh, Pa.
Augustus Day, Detroit, Mich.
The Railway Equipment Co., Chicago, Ill.
Carleton & Kissam, the United States Steam and Street Railway Advertising Co., New York.
St. Louis Register Co., St. Louis, Mo.
Eastern Electric Co., Boston, Mass.
The Lewis & Fowler Manufacturing Co., Brooklyn, N. Y.
The Lewis & Fowler Girder Rail Co., Brooklyn, N. Y.
John Stephenson Co., Limited, New York.
Hale & Kilburn Manufacturing Co., Philadelphia, Pa.
Taylor Electric Truck Co., Troy, N. Y.
Union Electric Co., New York.
Edison Manufacturing Co., New York.
Phœnix Bridge Co., Philadelphia, Pa.

The Chicago Edison Company's contribution to the Chicago parade on the World's Fair grounds on Chicago evening consisted of an immense mechanical dragon, 28 feet in length, with the proper proportions, which was illuminated by nearly 3,000 Edison lamps. Its long, red and flexible tongue was constantly in motion, with flaring lamps at the tip. An engine, boiler and a dynamo underneath the monster furnished power and light. The exhaust steam poured out of the nostrils and the dome of the engine from the top of the head. The display was a most striking one. The company purchased 300 tickets for Chicago day and furnished them free to employés.

Strain Insulators of the H. W. Johns Manufacturing Company.

We have recently received a new September catalogue, entitled "Insulation," from the electrical department of the H. W. Johns Manufacturing Company, and notice the appearance for the first time of cuts of several new designs of trolley line insulating materials. This book is issued in a very neat and compact form, with the subject matter conveniently arranged for ready reference. A large portion of the catalogue is devoted to the hangers, pull-offs, strain insulators and other well-known molded mica trolley insulators sold by the company. There are also cuts and descriptions of a new molded mica tree insulator, in split form, so as to be readily attached to any portion of a line; weather-proof sockets and rosette, made of molded mica; vulcabeston sheet, magnet spools, bushings, etc., and a new chapter has been added on asbestos for electrical purposes.

We reproduce the illustrations of the various strain insulators sold by the H. W. Johns Manufacturing Company. The most recent of these is the "Giant" strain, which is exceptionally strong and affords the most perfect insulation. Numerous tests made with standard testing machines have given the "Giant" insulator an average breaking strain of 6,500 pounds, which assures an ample factor of safety in the heaviest overhead construction. The design and construction of the insulator will be apparent from the sectional view. The insulated metal parts containing the eyes for the attachment of the span or guy wires are provided with circular heads, so arranged as to provide for an even distribution of the internal strains. The parts are insulated from each other by a thick disk of sheet mica, and also from the retaining metal shell by sheet mica in the form of thick collars, which secures them firmly in place, and renders displacement under strain or otherwise impossible. The retaining case and other parts are then most effectually insulated and covered exteriorly by molded mica, applied under great pressure, the finished insulator having the appearance illustrated in the cut.

The globe strain insulators have been very generally used in overhead insulation, and are so well-known as to require but brief mention. In these the insulator consists of two malleable iron rings, cast within each other by a special process, surrounded and thoroughly insulated within the globe-shaped mass of molded mica or "Monarch" insulating materials. The globe strain with clevis is similar in construction, and is provided with the forked end to form frog pull-offs, and for attachment to pole straps.

The Brooklyn strain insulator is made exceptionally strong to endure the strains in the heaviest construction. It allows for a take-up of three inches, and makes one of the handsomest forms of insulation for span wires and at the pull-off poles. The tree insulator, as already mentioned, consists of two pieces, which thus render its application easy to any portion of an electric light or feeder wire. It thus offers a protection from the usual dangers and losses which result from an abrasion of the insulated covering of the wire. The insulator is especially valuable as a precautionary measure, as the insulation of the wire is preserved and leaks averted.

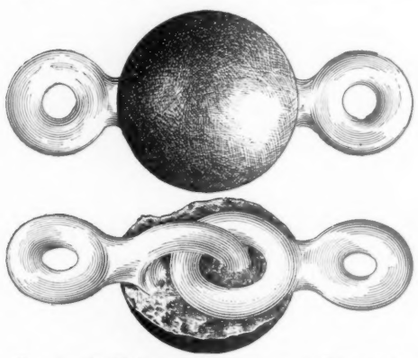


FIG. 2.—H. W. JOHNS MANUFACTURING COMPANY'S GLOBE STRAIN INSULATOR.

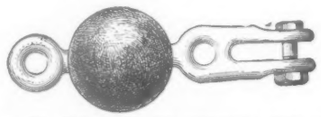


FIG. 4.—H. W. JOHNS MANUFACTURING COMPANY'S GLOBE STRAIN INSULATOR WITH CLEVIS.

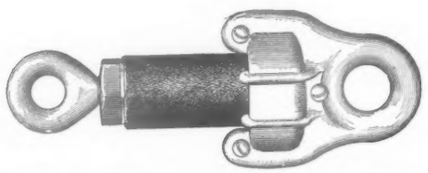


FIG. 5.—H. W. JOHNS MANUFACTURING COMPANY'S "BROOKLYN" STRAIN INSULATOR.

Motors of the Universal Electric Launch Company.

The Universal Electric Launch Company, of 45 Broadway, New York, and 45 York street, Brooklyn, are rapidly gaining fame in the manufacture of electric launches. The general use of electric lighting plants on yachts has resulted in a constantly increasing demand for electric launches or tenders to be used in connection with them, and this company is ready to meet the demand.

The motors in all their boats are designed especially for the work they are to perform and for their position in the boat. The general form of the machine, that of a letter "V," admits of its being placed under the forward deck in small boats, or under the flooring in larger boats, where it is out of the way, yet easily accessible. As the armature (the only moving part) is very low and near the keel, to which the machine is firmly bolted, there is no vibration. The armature is of the toothed type, which insures positive driving by the coils, and obviates all chances of a burn out. The commutator is made entirely of copper and phosphor bronze with mica insulation. All shafts are finely finished on ground centers and accurately fit the journals, which are made with a bushing or shell of special bearing metal. All machines are supplied with self-oiling rings, which revolve with the shaft and thoroughly lubricate the journals from the oil wells in the bearings. Carbon brushes are employed which admit of the machine being run in either direction without interfering with the brushes. These machines are thoroughly tested before being placed in the boats, and all the parts are interchangeable. The illustration on page 99 shows one of the company's motors in position in a boat.

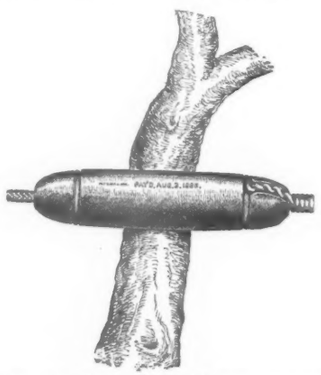


FIG. 3.—H. W. JOHNS MANUFACTURING COMPANY'S TREE INSULATOR.

The Lowell, Lawrence and Haverhill, Mass,, Street Railway recently petitioned the town of Groveland to lay double tracks through Main street in the north village. At a town meeting the petition was granted with conditions, among which were the building of sidewalks and grading of the street, and the establishment of five-cent fares from Groveland to West Newbury and from Groveland through Haverhill to the Methuen line. Supt. Frank Woodman, in an interview, states that the company will probably withdraw its petition in view of the stringency of the conditions.

The International Electrical Congress and World's Fair of 1893.

INAUGURAL ADDRESS OF THE PRESIDENT, EDWIN J. HOUSTON, AT THE SEVENTY-NINTH MEETING OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK, SEPTEMBER 20, 1893.

Gentlemen:—During the past few months a mighty human stream, daily increasing in volume, has continually flowed towards a single center of population in the North American continent. This stream, fed from all parts of the earth, is formed by the many millions who are journeying toward the World's Fair, to do honor to those four hundred years' growth of the greatest Republic the world has ever seen.

Many of us have but recently left this mighty stream. Like others we visited Chicago to become eye-witnesses of the nation's growth. But for this alone; perhaps the principal incentive to most of us has been a desire to take part in the International Electrical Congress of 1893, not only because we are especially interested in the progress of electrical science, but also because we are members of the American Institute of Electrical Engineers, with whom the first conception of this Electrical Congress originated.

It has occurred to me that in a brief inaugural address to the Institute, I could not select a better topic than the International Electrical Congress and World's Fair of 1893. I will, therefore, give you a few thoughts on this subject.

As in our journey we crossed the mighty continent, we saw on every side evidences of its vast mineral and agricultural wealth. As we passed through its populous cities and at last reached Chicago, we wandered through its streets and examined with admiration the long rows of stately buildings. In all these things we rejoiced at the growth of a nation that has achieved so much in so short a time. But was it not in that extra-mural, younger but potentially greater Chicago, yclep'd "The Great White City," that we were most impressed? Its grandly proportioned buildings that arose as if by magic would have rendered a distant journey profitable, as a mere architectural display. But when we crossed their portals and examined the rich exhibits, collected from all parts of the world, we rejoice in these proofs both of the nation's and of the world's progress.

But the growth of the American Republic during the 400 years that have passed since its discovery by the Genoese Navigator, marvelous as it has been, it less astonishing to us as electricians than the extraordinary development in that vigorous science, electricity, to which many of us have devoted the energies of our lives. Contrasting the World's Fair of Chicago of 1893, which embraces exhibits in all departments of man's skill and industry, with the Philadelphia International Exhibition of 1884, which, as you remember, was devoted wholly to electricity, I think you will agree with me that we have ample reason to rejoice at the progress made in the electrical field during the past nine years.

I have no sympathy with the unthinking critic who expresses disappointment with what he chooses to style the meagerness of the electrical display of the Chicago Exhibition. He probably estimates the value of an exhibit by the number of square feet of floor space it covers, rather than by its inherent possibilities. To my mind many exhibits whose actual demand for floor space are limited to less than 100 square feet, would, were they estimated from the standpoint of their true value, demand more than the entire area of the exhibition grounds for their display.

Such critics fail to appreciate the fact that not in the Electricity Building alone, but throughout the entire exhibition as well, there is to be seen a grand display of the wonder working force of electricity. Almost countless arc and incandescent lights turn

night into day, both in the buildings and over the extended areas outside them. Powerful search lights flash their bright beams far and wide beyond the gates of "The White City." Electric launches on the lagoons, and electric cars on the intramural railway show by actual practice the power electricity possesses in systems of transportation. Systems of telegraphic and telephonic communication vie with systems of time transmission, annunciator, fire, burglar and temperature alarms, both in Electricity Building and elsewhere, not only as exhibits pure and simple, but also in that shape which we, as practical men, so delight to see as representing the highest type of scientific achievement, viz., in every day practice.

I think no one will question the completeness of the electric motor exhibit. Both in Electricity Building and elsewhere, electric motors in many forms are to be seen performing work, varying in amount from that required to move the most delicate machinery, to that capable of driving a full size locomotive. Nor is the exhibit of dynamos incomplete. An excellent display is made in Electricity Building, while a fair proportion of the entire floor space of the Palace of Mechanic Arts is occupied by working dynamos, not so much as an exhibition, as a great central lighting station established for the illumination of the buildings and grounds.

Perhaps the most striking proof of the advance that has been made in electricity since the time of the International Electrical Exhibition of 1884, in Philadelphia, a period less than a single decade, is that many of the achievements of electricity have proved such boons to the world, and have so thoroughly come into every day use that they have ceased to be regarded as wonders. It, therefore, no more enters into the minds of those who are operating electrical apparatus embodying such achievements, that they form proper objects for exhibition, than it would for them to exhibit any other universally good thing, such as sunshine, air or water.

Even we, who know better, are apt to follow the lead of the unreflecting, and are often too ready to relegate some nine days wonder of electricity to the domain of the common and prosaic. We speak through a conducting wire, and the world wonders that the potentiality of the intricate waves of articulate speech can be so transmitted. We examine the mechanism of the apparatus, understand its operation and promptly cease to wonder, since we see that such mechanism must be operative. We extend the distance through which we can thus carry on intelligible speech until it reaches to over a thousand miles. Again a nine-days wonder, and the world freely gives its plaudits to the brainy men who have contributed to this success; but in a short time even this achievement is tacitly relegated to the ordinary and the common, and it, therefore, ceases to be regarded as a thing worthy of special exhibition. When, through the courtesy of the American Bell Telephone Company, I was permitted, as were doubtless many of you, to carry on an extended conversation between Chicago and New York, or even between Chicago and Boston, by the long distance telephone, the apparatus must have seemed to you, as it did to me, a great achievement, and one which particularly accentuated the wonderful recent growth of electrical science.

But these inventions do not stand alone. There are many others. Take, for example, the telautograph, of Gray; the radiophone, of Bell; the Cuttriss syphon-recorder, of the Commercial Cable Company; the practical welding process of Elihu Thomson; or consider some of the many brilliant discoveries which Tesla gave to the world but a few years ago, but which are even now almost regarded as old; or consider some of the possibilities at which the same investigator hinted in his recent lecture in Chicago on mechanical and electrical oscillators; or look at the almost innumerable improvements in the details of apparatus, or of systems of distribution, little things in themselves, but such little things as determine the difference between success and failure; or consider the thousand and one other novelties with which you are acquainted, and which, doubtless, called from you much admiration for the ability of their ingenious inventors.

But I will go no further in this direction. I will content myself to submit to your judgment, being sure of a favorable verdict, the correctness of the belief above expressed, that electrical science has made wonderful progress since 1884, and that such progress has not failed to receive proper and extended exhibition at the World's Fair in Chicago in 1893.

The Chicago Exhibition still exists. It may yet be visited and compelled still further to yield its intellectual benefits.

But the Chicago International Electrical Congress of 1893 has come and gone. That it has accomplished much lasting good, I think there can be no reasonable doubt. That it might have accomplished more under a more liberal leading there can, I think, be equally no doubt. But, taking all in all, I feel that the electrical fraternity throughout the world are to be sincerely congratulated on the results of its work.

I shall not speak of the excellent papers read before the different sections of the Congress. You are as well acquainted with them as I am. I may, however, state in this connection, that out of some 30 of these papers no less than 15 were by members of the American Institute of Electrical Engineers; and that out of 17 American papers no less than 14 were by members of the Institute. This, I think, is a record for which I may be permitted officially to congratulate you.

The work of the Chamber of Delegates was especially of a satisfactory character. Though the good work might have been profitably extended to a number of additional topics, such, for example, as a more definite discussion of the magnetic units, and an adoption of practical units, of light and of illumination, and to some definite action on a uniform system of general notation, yet I think you will agree with me that the work actually accomplished has been of a very valuable character.

Through the courtesy of Prof. Edward L. Nichols, the official secretary of the Chamber of Delegates, I am permitted to present to you the following official report of the work accomplished by the Chamber of Delegates.

REPORT OF THE CHAMBER OF DELEGATES AND CLOSING MEETING OF THE CONGRESS.

The Congress was brought to a close by a general meeting of all the sections in Columbus Hall, at the Art Institute. Dr. Elisha Gray presided, and the official delegates occupied the platform. Prof. Edward L. Nichols, Secretary of the Chamber of Delegates, then read the report of that body, containing the following recommendations:

Resolved, That the several governments represented by the delegates of this International Congress of Electricians be, and they are hereby, recommended to formally adopt as legal units of electrical measure the following:

As a Unit of Resistance, the International Ohm, which is based upon the ohm equal to 10^9 units of resistance of the C. G. S. system of electro-magnetic units, and is represented by the resistance offered to an unvarying electric current by a column of mercury at the temperature of melting ice, 14.4521 grammes in mass, of a constant cross-sectional area and of the length of 106.3 centimetres.

As a Unit of Current, the International Ampere, which is one-tenth of the unit of current of the C. G. S. system of electro-magnetic units, and which is represented sufficiently well for practical use by the unvarying current which, when passed through a solution of nitrate of silver in water, and in accordance with the accompanying specification, deposits silver at the rate of 0.001118 grammes per second.

As a Unit of E. M. F., the International Volt, which is the E. M. F. that, steadily applied to a conductor whose resistance is one international ohm, will produce a current of one international ampere, and which is represented sufficiently well for practical use by $\frac{1000}{1412}$ of the E. M. F. between the poles or electrorodes of the voltaic cell, known as Clark's cell, at a temperature of 15° C., and prepared in the manner described in the accompanying specification.

As the Unit of Quantity, the International Coulomb, which is the quantity of electricity transferred by a current of one international ampere in one second.

As the Unit of Capacity, the International Farad, which is the capacity of a conductor charged to a potential of one international volt by one international coulomb of electricity.

As the Unit of Work, the Joule, which is 10^7 units of work in the C. G. S. system, and which is represented sufficiently well for practical use by the energy expanded in one second by an international ampere in an international ohm.

As the Unit of Power, the International Watt, which is equal to 10^7 units of power in the C. G. S. system, and which is represented sufficiently well for practical use by the work done at the rate of one Joule per second.

As the Unit of Induction, the Henry, which is the induction in the circuit when the E. M. F. induced in this circuit is one international volt, while the inducing current varies at the rate of one international ampere per second.

The secretary also read the following report of the committee appointed to consider the standard of light:

They have had much discussion upon the various forms suggested for practical standards, and in particular upon the two special forms of lamps known as the amyl-acetate lamp of von Hefner-Alteneck, and the pentane lamp of Vernon Harcourt. The only practical lamp actually presented to the committee is the new von Hefner lamp which, although it has been laboriously tested at the Reichsanstalt, and reported accurate to within two per cent., has not received any extended trial in other lands. On the other hand it was reported that the pentane lamp in its recent improved form was preferred in England for the photometry of gas lights. There is the objection to the pentane lamp, that the composition of the commercial pentane is not sufficiently well defined; and to the amyl-acetate lamp that its color is too red in hue; finally, objection to all open flame lamps is that they are too liable to be influenced by the changes in the pressure, temperature and moisture in the air. It is admitted on the other hand that no electric lamp suitable for use as a convenient practical standard has yet been realized. Under these circumstances there was a sharp division in the committee between those who advocated the von Hefner lamp as an independent standard, and those who desired to maintain a *statu quo* until further researches should have been made in various countries.

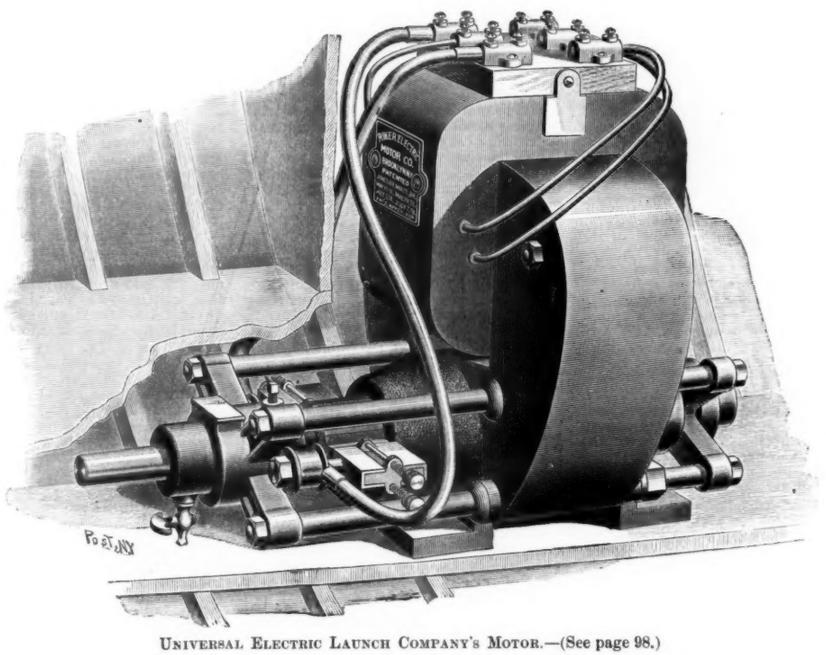
It was proposed by Drs. Budde and Lummer that the Hefner-Alteneck lamp, constructed exactly according to the specifications of Mr. von Hefner-Alteneck, be introduced as a provisional, practical standard of light, and that the problem of determining its value in terms of an absolute unit be left to subsequent investigation. On vote this was lost by two votes for and four votes against. The following motion, proposed by Messrs. Palaz and Thompson, and amended by Drs. Budde and Lummer, was then carried unanimously:

Resolved, That this committee, while recognizing the great progress realized in the standard lamp of von Hefner-Alteneck and the important researches made at the Reichsanstalt, also recognizes that other standards have been proposed, and are now being tried, and that there are serious objections to every kind of standard in which an open flame is employed; it is, therefore, unable to recommend the adoption at the present time of either the von Hefner lamp or the pentane lamp, but recommends that all nations be invited to make researches in common on well defined practical standards and on a convenient realization of an absolute unit.

(Signed) J. VIOLLE,
E. BUDDE,
EDW. L. NICHOLS,
A. PALAZ,
SILVANUS P. THOMPSON,
O. LUMMER.

The electricians of America ought especially to feel satisfied with that part of the work of the Chamber of Delegates which resulted in the recommendation of the adoption of the name Henry for the practical unit of induction.

The early work of Prof. Joseph Henry in the domain of self and mutual induction is too well known in this assembly to need comment. The principle of naming the practical electrical units after distinguished electricians who have passed from their labors, having been established, it appeared eminently proper to confer this honor on that illustrious electrician whom we are proud to claim as an American. Its adoption is especially gratifying to the American Institute of Electrical Engineers, who first



UNIVERSAL ELECTRIC LAUNCH COMPANY'S MOTOR.—(See page 98.)

proposed the name. There was, too, a peculiar fitness in thus bestowing this honor on America, at a time when the whole world has united in sending its choicest products to our great exhibition to honor the four hundredth year of the discovery of America.

Knowing, as we do, the desire of France to retain the name quadrant for the practical unit of induction, it was especially gratifying to us to learn that the resolution to name this unit the Henry, after the distinguished American electrician, was introduced into the Chamber of Delegates, by Mascart, of France, and seconded by Ayrton, of England.

I know how much easier it is to find fault with an enterprise and show how it should have been conducted than it would be to carry it on successfully oneself. I have, therefore, no little hesitancy in criticising any part of the work of the late Electrical Congress; but, looking at the recent Electrical Congress as I experienced it, I trust I may be pardoned if I point out some respects in which I believe it could have been improved. I do this, not for the purpose of finding fault with the conduct of the Congress, nor of criticising any of its officials; for, on the whole, the results achieved are excellent. I criticise it only with the hope of preventing similar errors in the future, and to correct impressions that have prevailed, especially among our foreign friends, that all the arrangements for the Electrical Congress were in the hands of the Institute. The only work with which our Institute was officially connected was that considered by the Chamber of Delegates. As this was prepared by the Sub-Committee on Provisional Programme, and printed in the Transactions, beginning with the issue for January, 1893, you are, of course, familiar with it. Hospitalier's system of notation was also translated and reprinted in the Transactions, and copies furnished to the Chamber of Delegates.

I think all who attend any of the many congresses held under the auspices of the Electrical Congress Committee of the World's Fair Auxiliary will agree with me that wretched judgment was displayed in holding the sessions of the congresses in the Art Institute. This building, as we know from bitter experience, was entirely unsuited for the purposes of a learned assembly, being situated in a noisy city, alongside a line of railroad that was carrying an enormous traffic, and directly opposite a great railroad yard, where the constant shifting of cars, the puffing of locomotives, the blowing of whistles and the ringing of bells rendered very much of what was said at the Congress inaudible.

I believe I but voice the general sentiment when I object to the distance the place selected for holding the meetings of the Congress was from the Fair grounds. The selection of this site necessitated a considerable loss of precious time in going between the exhibition and the Congress; time whose value can be estimated only by the loss of the rare opportunities for culture afforded by the rich exhibits within the grounds.

The division of the Congress into different sections, to wit: Section A, Pure Theory; Section B, Theory and Practice; Section C, Pure Practice, was also in my judgment exceedingly unfortunate.

There may be such a thing as pure theory apart from practice, though I am disposed to doubt it; for theory is, or at least should be, based on facts, *i. e.*, on practice, and cannot be properly dissociated from it. But, however this may be, I feel sure there can be no such thing as pure practice apart from theory; to my mind the two necessarily go hand in hand, and cannot, therefore, be separated.

But apart from this, the division appears to me to be unfortunate as well as arbitrary; for there can be no doubt that the greater part of the advantage derived from congresses or other assemblies of intellectual men comes from the contact of mind with mind; not from the contact of similar, but of dissimilar minds. Any attempt, therefore, arbitrarily to divide a large cultured assembly into classes, must, I think, result disastrously.

This division of the Congress into sections was also unfortunate, inasmuch as it prevented the members of the Congress from hearing many papers or discussions on subjects in which they were interested, from the impossibility of simultaneously attending the several sections. This difficulty might have been lessened had the programme been arranged so as to give the titles of papers and the order in which they would be presented in each section, thus affording an approximate idea of the time. This practice is well understood, and followed in meetings of most technical societies.

I think it was a grave mistake to have made the sittings of the Chamber of Delegates private. No harm could possibly have resulted from permitting the general Congress to listen to the debates. On the contrary, I believe much good must have so resulted. Indeed, I see no reason why the members of the general Congress should not have been permitted to take part in the discussion, though not permitted to vote.

But, to my mind, the most unfortunate feature was the preliminary work of the Electrical Congress of 1893, as carried on by the Committee of the World's Congress Auxiliary. Notwithstanding the fact that the determination to hold an International Electrical Congress originated with the American Institute of Electrical Engineers, and notwithstanding the excellent prior work, the Institute in arranging preliminary details, the World's Congress Auxiliary, an organization created for the purpose of conducting the many different congresses that were to assemble in Chicago during the World's Fair, made it a cardinal principle of procedure, that no society should be permitted to take charge of the work of a congress.

When the varied character of the numerous learned congresses that were expected to meet in Chicago during 1893 is taken into consideration, we may be able to form some idea of the herculean labor the World's Congress Auxiliary thus assumed. We are, therefore, less surprised at their failure in many cases to invite the most prominent men to represent the particular subjects involved.

Where the interests in any line of intellectual work were represented by different societies of fairly equal importance, we are willing to admit the advisability of preventing the influence of a single society dominating that particular congress, though even this case affords no reason why such congress should not be conducted by a joint committee fairly representing the different societies. But the Institute of Electrical Engineers is confessedly the representative electrical society of the United States. I submit, therefore, that the policy of excluding the Institute from the conduct of the Electrical Congress, and of persistently denying it official recognition, was both unfortunate and indefensible.

For my part, I am unable to see how any small body of men, such, for example, those forming the World's Congress Auxiliary, no matter how profound or extensive their erudition, could hope to be able to properly and efficiently arrange the meetings of so many different learned congresses so as to ensure the presence of the men most fitted to undertake the different characters of work.

I, therefore, feel that the refusal of the World's Congress Auxiliary to permit the work of each particular congress to be arranged and carried on by the representative society or societies in the branches to which such congress related, was a radical error which must, in most cases, have seriously interfered with its usefulness, and which should be especially avoided in the future.

It has occurred to me that it might, perhaps, be advisable to place on record a brief history of the part taken by the American Institute of Electrical Engineers in the World's Electrical Congress of 1893.

I am indebted to our secretary, Mr. R. W. Pope, and to the official records of the Institute, for the facts.

The American Institute of Electrical Engineers, being generally recognized as the national electrical organization of America, deemed it advisable, as early as 1889, to take steps towards identifying itself with international work, thereby securing proper recognition for the important electrical researches of Americans which had hitherto been ignored, not by reason of their lack of importance, but because no organized body representing America had ever participated in the International Congresses of Europe. Five delegates, representing the Institute, were accordingly appointed to attend the International Congress held in Paris in 1889. As it was believed that a World's Fair would be held in America in 1892, to commemorate the discovery of the continent, the Institute determined that an International Electrical Congress should be convened at that time in whatever city the Fair might be held.

In August, 1889, a committee was appointed by President Elihu Thomson, to make preparations for such proposed International Electrical Congress of America.

The postponement of the date of the World's Fair to 1893, and the holding of an International Electrical Congress at Frankfort in 1891, rendered it unnecessary for this committee to do anything more than to take advantage of the coming Frankfort Congress again to notify the world of their intention of holding an International Congress in America during 1893.

On September 16, 1890, the following resolutions were adopted by the American Institute of Electrical Engineers:

Whereas, It has been the custom in the nomenclature of electrical units to perpetuate the names of men who have contributed most to electrical science; and

Whereas, In the names thus far adopted, the eminent services of Americans have not been recognized; therefore,

Resolved, That, in the opinion of the American Institute of Electrical Engineers, a just distribution of the honors thus bestowed necessitates a recognition of one or both of America's great electricians —Benjamin Franklin and Joseph Henry;

Resolved, That the name of Henry should be given to the practical unit of self-induction, since he was the discoverer and greatest investigator of this phenomenon, and because this unit at present is called a quadrant, which is merely a numerical value and not a suitable name.

Resolved, That this Institute recommends to electrical societies and electrical engineers the general use of the name Henry for the unit of induction, as being the quickest and surest way to secure its final adoption.

Upon the receipt of an invitation extended by the management of the Frankfort International Congress of 1891 to the American Institute of Electrical Engineers to take part in its deliberations, five delegates were appointed by the Chair to attend the Frankfort Congress, at the general meeting of the Institute, on May 21.

The adjournment of the Frankfort Congress, to meet in Chicago in 1893, was considered as settling the fact that an International Electrical Congress was to be held at that time, and the Institute, therefore, continued its preparatory work, and on October 27, 1891, its Committee on the International Congress of 1893 reorganized as follows, viz.:

T. Commerford Martin, chairman; Ralph W. Pope, secretary; Prof. W. A. Anthony, Prof. Alex. Graham Bell, Prof. Francis B. Crocker, Prof. Charles R. Cross, Dr. William E. Geyer, Ludwig Gutmann, George A. Hamilton, Col. Charles H. Haskins, Carl Hering, Prof. Edwin J. Houston, A. E. Kennelly, T. D. Lockwood, C. O. Mailloux, Prof. Henry Morton, Dr. Edward L. Nichols, George M. Phelps, Franklin L. Pope, Nikola Tesla, Prof. Elihu Thomson, Edward Weston and Dr. Schuyler S. Wheeler.

Sub committee on provisional programme: Carl Hering, Prof. W. A. Anthony and A. E. Kennelly.

But these preparations for an International Electrical Congress were rendered futile by the decision of the officials of the World's Fair, that the organizations of all the world's congresses that were to be held in connection with the World's Columbian Exposition should be placed in the hands of the World's Congress Auxiliary, and that all details connected with the proposed Electrical Congress should be placed in the hands of the World's Congress Auxiliary Electrical Committee, of which Dr. Elisha Gray was chairman.

At a meeting of the Institute's Congress Committee, held in New York in December, 1891, Dr Gray emphatically stated that no society would be permitted to take charge of the work of a congress, the World's Congress Auxiliary Electrical Committee being created for that express purpose. The Institute unavailingly contended that it should at least receive official recognition in the conduct of the Congress. Having solely in view the advance of electrical science, in the interests of harmony it reluctantly passed the following resolution December 23, 1891:

Resolved, That the American Institute of Electrical Engineers, having already taken action during the past three years, by correspondence and otherwise, toward the holding of an International Electrical Congress in connection with the Columbian World's Fair, hereby expresses its desire and intention to co-operate, by all means in its power, with the World's Congress Auxiliary of the World's Columbian Exposition, through its Electrical Congress Committee, in furthering the gathering of such a congress at Chicago, in 1893, and in making it a successful and worthy representation of the best electrical science and practice in all parts of the world.

With this resolution the Institute relinquished all responsibility for the management of the Congress, but continued the work of preparation by the appointment of a sub-committee on a provisional programme.

There are several important topics that failed to receive final or sufficient treatment by the chamber of delegates. Prominent among these are the practical units of light and of illumination. It has been proposed that the American Institute of Electrical Engineers take up and complete this unfinished work.

I deem the proposition extremely valuable, and would suggest that the Institute take up the work after substantially the following plan, viz., to increase the regular committee of the Institute on units and standards and appoint a number of sub committees, to whom shall be entrusted the carrying on the necessary experimental work on which to base practical standards of light and of illumination.

I would suggest that the sub-committees be constituted as follows: That a chairman be named in as many of the colleges, universities, or other learned institutions as possess the necessary physical or electrical laboratories as the Institute may select, and authorize each chairman to name additional members, subject to confirmation by the Institute, from their colleagues in their respective faculties, or from proper parties residing in the vicinity, to carry on, without expense to the Institute, the necessary investigations.

This work should be distinctively institute work. Therefore, no one should be permitted to serve on such committees, or to take part in such work, who is not a member of the American Institute of Electrical Engineers.

Our distinguished honorary member, Mr. Preece, of England, has kindly offered to undertake such work in England, and to associate with himself such other parties as we may determine. I would earnestly suggest the Institute authorize me to appoint the necessary sub-committees, so that they may proceed at once to the work suggested.

In conclusion permit me to say that I esteem it a very high honor to have been elected by your votes to the Presidency of the American Institute of Electrical Engineers. Even to belong to this Institute is an honor that is not conferred inadvisably; therefore, to be called to represent so distinguished a body of men is something for which I may, perhaps, be pardoned if I feel proud.

During the pleasant week of the International Electrical Congress of Chicago, I have, as far as possible, embraced the opportunity of entering into more intimate relations with many of its members, and have thus acquired a better acquaintance with its *personnel*. From what I know of the early history of the Electrical Congress, from what I saw of its actual work, and from the knowledge I have gained of those of its very many members who were also members of American Institute of Electrical Engineers, I feel that our Institute has not failed in contributing its full share towards whatever success the Congress has achieved.

Mr. Lockwood: I sincerely trust that I shall not even for a single moment be thought guilty of disrespect to the chair, though I deliberately transgress the accepted rules of order, and turn my back wholly on Cushing's Manual (not being accustomed to manual labor), by addressing my remarks to the gentleman sitting at your left, the secretary of this Institute. Mr. Secretary and gentlemen of the American Institute of Electrical Engineers, you have with myself heard, with feelings of pleasure and admiration, the inaugural address of the President of this Institute. We should, I am sure, consider ourselves fortunate, and unite in our felicitations that we have as our presiding officer for this year a gentleman who has so thoroughly proved his powers of observation; who has combined with those powers of observation the faculty of so happily putting them into exceptionally graphic language, and who possesses the literary faculty of being capable to develop in so short a time, not only a thoroughly readable, but a thoroughly eloquent and, therefore, a listenable production.

It appears to me that his comments upon the necessarily co-operative and co-ordinate relations of true theory and true practice, and his very decidedly expressed opinion that, what God has joined together, no man or committee should put asunder, especially are of such a character as to commend themselves to every one.

And I have very great pleasure, Mr. Secretary, in moving a vote of thanks to the President for his able and instructive inaugural address, with the request that he permit the same to be published in the proceedings of the Institute.

[The motion was seconded by Mr. Phelps, and carried unanimously after being put by the Secretary.]

The President: Gentlemen, I thank you. I know that I voice the sentiments of the Institute when I take the liberty of calling on our distinguished honorary member to give you, in a brief address, some of his impressions of the Congress, or anything else that he may feel like talking to us about. [Applause.]

Mr. Preece: Mr. President and Gentlemen, if it had not been for the alacrity of Mr. Lockwood, I think that I should have claimed the indulgence of this meeting to have broken your rules, and asked you to allow me, in our usual English fashion, to propose a vote of thanks to your President for the clear, able and extremely interesting address that he has given you. But my wish has been forestalled, and I am asked to give you my thoughts, or an address on anything. Of course, I cannot go beyond Chicago, and I cannot forget the Congress. At the same time I did feel a certain sensation of satisfaction and pride when, in the earlier part of his address, your President referred to the four hundred years' history of this great Republic. When he made that allusion, I could not forget the fact that for about three hundred years this so-called republic was acting under the guidance of the Old Country at home. [Applause.] So that I feel that of whatever progress you have made here, we can at any rate claim some little share. Action, sir, and re-action, we have all been told, and, I have no doubt, you have often taught, are exactly similiar, and, while in the past, a hundred years ago or more, you taught us a very severe lesson by foolishly chucking some tea into the sea, we, on the other hand, have learned a much greater lesson, and ever since then have allowed all our children to do just whatever they like, and they always do it. [Applause.] I cannot also forget that your President referred to the history of electrical enterprise in this country during the past nine years, from 1884. It happens that that year was exactly coincident with my last visit to this great country. I was present at the exhibition in Philadelphia, in 1884, and when I look back to the history of the past nine years, I cannot shut my eyes to the fact that every single advance of any consequence or

any value has taken place in this country. You alluded especially to the introduction of motors. There is nothing that strikes us, who come over from the other side of the Atlantic, so much as the marvelous, the wonderful advance that has been made in the extension of electric railways. I have come over here not alone to attend the Congress, not alone to see the World's Fair, but to see, to the utmost of my ability, during the time allowed me, all progress made in all branches of electrical industry, and while the advances in telephony, and the advances in electric lighting and other applications of electricity are great and striking, there is nothing so wonderful and so astounding as the development of electric railways, and particularly of electric railways in Boston. You made some allusion, too, to the wonders of science, and that we, who come day by day, in the performance of our allotted tasks, to the application of science to the wants and purposes of mankind, are apt to get rather careless and indifferent to the wonders of science that are displayed about us. So far as I am personally concerned, I do not agree with you in that respect. There is not a single day of my life that I do not feel the utmost wonderment at the advances of science, and especially of electricity, and although nothing is more startling and wonderful than the reproduction of the human voice, and the production of the electric light, still all these fade when you come to think of the marvelous influence of light in producing pictures. There is something in the interaction of those undulatory movements that constitute light and produce pictures, and those undulatory movements that you allude to as being in the domain which Tesla is now exploring; there is something in the connection between light and sound, and electricity and motion generally, that indicates a reason why the conveners of the Congress at Chicago should have divided the subject into pure theory and pure practice. Theory covers a field. There is a field that is apart from practice. There is a field in which the philosopher wanders and gives play to his imagination, and I cannot help thinking that we are now, thanks to the practice of the past, gradually approaching a shore on which we can pick up pebbles that will sooner or later give us a clue and an indication of the actual existence of the marvelous power or force that sometimes we call electricity, sometimes energy, sometimes light, but which is really the evidence of some wonderful agency which exists in nature, of which at the present moment we are absolutely ignorant. And, therefore, it is that electricity shadows before us something that enables the old gentlemen—you and I, sir—to wander at will in fields that will warrant future congresses in justifying the division of the Congress in Chicago into two classes at any rate—practice and theory.

Now you must not forget this—that one part of the Congress at Chicago was governmental and official. It was called together by the government of the United States; it was responded to by every government in Europe and we met together there. I am delighted to hear you grumble and growl. It is one of the privileges of the Anglo Saxon race to be able to growl to their heart's content. By your grumbling and your growling you save the necessity for anybody else doing it. It would be extremely ungracious, it would be inhospitable, it would be outrageous on the part of a guest like myself to grumble and growl. At the same time I am glad to have it done. [Applause.]

Now I interrupted you, sir, when you suggested that the henry was proposed by Mascart and seconded by myself. I should have been delighted to second it. Nothing on earth that I know of would have given me greater pleasure than to have seconded that proposal, and I was prepared to do it. But we thought there was an additional grace in its being seconded by Professor Ayrton, for Professor Ayrton had himself proposed a name for this unit—a secohm—and he, in conjunction with Professor Perry, had invented an instrument to measure the unit, called a secohmmeter, and there was something particularly pretty in the notion that the henry should be proposed by such a Frenchman as Mascart, and seconded by such an Englishman as Ayrton. [Loud applause.]

You also implied that the work of the American Institute of Electrical Engineers did not receive its full meed of praise. I do not care two pence about the World's Fair, or the World's Congress Auxiliary, or what they may have done, but I know this, that I am expressing the sentiments of every single foreigner—I do not call myself a foreigner, as you know—but I express the feelings of everybody there, that there was one haven of rest where we could all go to receive a little comfort, and that was the office of the Institute of Electrical Engineers of America, and there was one cheery face that always welcomed us there, was glad to see us and who did all he could to make our visit to Chicago as pleasant as it could be made. And it was pleasant. I do not think that I can refer to any visit that I have ever made anywhere, that I shall ever recall with greater pleasure than my visit to Chicago, and especially it will be associated with the American Institute of Electrical Engineers; not because they did as much as they could do, but because of all the titles and honors that I hold, there is not one which I feel a greater pride in holding than that of being an honorary member of the American Institute of Electrical Engineers.

Sir, it was my intention to propose a vote of thanks to you. I do not propose that vote of thanks, because it has been done. But I desire to express to you my great obligations for giving me such a capital resumé of what you saw at Chicago and what I saw. I do not mind telling you, gentlemen, that I came over to this country to steal all I could, and I intend to go back and make use of all I have learned, and one thing I certainly shall do, I shall make free use of your ideas, sir, and in the report I make to the Institution of Electrical Engineers, and in the reports that I make to her Majesty's government of what I have done and seen here, I shall

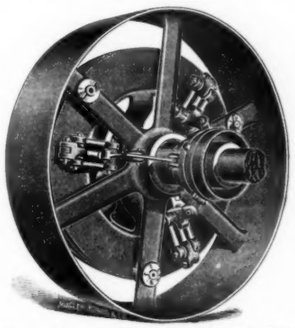


FIG. 1.—PENFIELD'S "IMPERIAL" FRICTION CLUTCH PULLEY.

certainly refer to the address delivered to this Institute, and also to the good work that has been done by this Institute, membership in which I feel such a pride of holding. [Applause.]

There is just one point that I wish to refer to.

Your President alluded to the fact of the work left undone. He said that I was prepared to carry on that work in England, as your honorary member, and I shall do so, not alone because I am an honorary member of this Institute, but because I am deeply interested in the adoption by the electrical fraternity of a unit, not of light, but of illumination. I want to know what is the light on that paper. I do not care a button where it comes from. It may be gas, or a candle, or the sun, or the moon. We want to be able to express in something that we understand as clearly as we understand the ohm, the ampere or the henry; we want to express exactly what is the illumination on that paper; and, therefore, it is that I support for that purpose with all my power the proposal of your President for the establishment of a committee to deal with this matter. We will work at it very hard in England, and I hope that we shall be able to do something to enable you to come to a decision.

The President: Gentlemen, the hour is running on. Will you take any action in this matter? There is really no motion before the Institute. I think the Institute can do very excellent work in this connection.

Mr. F. W. Jones: I move, Mr. President, that the chair be authorized to appoint a committee to carry out the suggestions made in the inaugural address of the President.

[The motion was carried, and the chair subsequently appointed Mr. A. E. Kennelly, Dr. Wm. E. Geyer and Mr. Carl Hering.]

Mr. Steinmetz: I would like to say a few words on a matter that has been considered several times here, viz., the establishment of local branches or chapters of the Institute. I wish to sound the sentiment of the Institute about the establishment of a chapter in Lynn.

As you know, there is an electrical organization there, having something like 70 or 90 members, and about the same tendency as our Institute here. At the last meeting of this organization—the Thomson Scientific Club—the question was brought up whether it would be advisable to join hands with the American Institute of Electrical Engineers. No definite action was taken, but I was instructed to ascertain the state of feeling here in New York. The main reason was and is, undoubtedly, the rapidly increasing influence and importance of this Institute as displayed during the time of the Electrical Congress in Chicago, and as expressed in the scientific papers published in the transactions of the Institute. We knew that this question had been discussed here by the Institute frequently, and that, as I believe, the general sentiment was towards the establishment of such chapters.

Now, I should like to hear what the members think about this question, and how they would stand if the proposition to unite with the Institute were brought up by the Thomson Scientific Club, of Lynn. Our idea was that some kind of an arrangement could be made so that election to membership would take place in the same manner as before, by the Council of the Institute; that the local chapter would have the right to elect local members, which would have full vote on all local matters, but have no vote on general matters, and that, at the time of consolidation, the members of the local organization, who are not members of the Institute, become local members.

In Lynn, out of 70 or 80 members of the local organization, there are about 10 or 15 members of the Institute, and the cause for this small percentage is that the tendency of the local organization is about the same, on a smaller scale, as that of the Institute. Most of the electrical engineers there think it their duty to build up the local organization, and they do not care to be members of the two organizations, and, therefore, do not become members of the Institute; but now that it has reached such importance, they would like to be members of it without giving up their local organization.

Furthermore, I think there would be no difficulty in having papers read before the local organization printed in the Transactions under the same conditions as they are now printed, *i. e.*, that the author of a paper sends it in for acceptance a sufficient time before the meeting to have the advance copies printed, or, in other words, that members of the Institute have the right to read their paper before the local branch, instead of before the general organization; or, where it is desirable, to read the paper personally at the one, and by proxy at the other meeting. I would like to hear from the members what their opinion would be upon such a proposition.

Mr. Hammer: I would suggest that, as this same question has recently come up in connection with the city of Cincinnati, the city of Philadelphia, and the city of Chicago, the Thomson Scientific Club be requested to send a report, embodying their views, to the council, and have it taken up in connection with these other applications, and then have the council submit the matter for the approval of the Institute.

The President: I think that is a very sensible suggestion.

The Secretary: As I told the gentlemen at Chicago, we could not force them to hold meetings, and we could not prevent their holding meetings if they wished to. We have the opinions of single individuals as to what they thought they could do. But we have not, as yet, had any united request from any number of members that would signify that they wished to hold meetings.

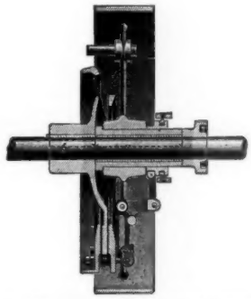


FIG. 2.—SECTIONAL VIEW OF "IMPERIAL" FRICTION CLUTCH PULLEY.

In Lynn we have about 20 members. The proper procedure would be for them to draw up a proposition, signed by enough names to give it weight, and then send it to the council, when it can be taken up and considered.

Mr. Steinmetz: I would not recommend the Institute to take any action at present. My object was first to present the matter and see how its members would regard such a proposition.

(Adjourned.)

An Ohio trolley road has put an appliance into use which is well calculated to prevent collisions between electric cars and railway trains. The appliance consists of a safety switch for railroad crossings, which is so constructed that an electric car cannot pass a railroad track until the conductor or motorman has first crossed the railroad track and set the switch for the electric car to cross. The idea of this is to compel the conductor to get upon the railroad track before his car runs up it, and makes a collision almost a physical impossibility. These switches have been put in at the Cleveland & Pittsburgh crossing at Buckeye street, and the C., L. & W. and C. & P. crossings at Bridgeport, and at all other crossings on the new part of line.

An Improved Friction Clutch Pulley.

Our attention has been called to an improved friction clutch pulley, called the "Imperial," and manufactured by the well-known firm of J. W. Penfield & Son, of Willoughby, O. The pulley has a novel form of construction, which, it is claimed, secures increased efficiency, durability, ease of adjustment and quickness of repair, overcoming the only valid objections heretofore urged against friction clutch pulleys in general. The clutch mechanism of the "Imperial" pulley may be briefly described as follows: The pulley is provided with two circular friction rings between which is a friction disk. The friction disk is keyed to the shaft and turns with it, while the balance of the mechanism and pulley is loose on the shaft. The clutch levers clamp the friction disk between the friction rings, thereby setting the pulley in motion. The clutch mechanism is very positive and quick acting, giving immediate control over the pulley.

The friction surfaces of the friction rings are protected by strips of insulated fibre, affording extra precaution against wear. These strips can be replaced at any time. The bushings are made in halves, and are renewable. They are babbitted, and can be removed and rebabbitted at any time without taking the pulley from the shaft. As the friction surfaces and bushings are the parts subject to greatest wear, the construction of the "Imperial" pulley, permitting the renewal of these parts readily, enables the user to keep the pulleys in perfect repair and running order.

The advantages of equipping the line shaft with clutch pulleys are well-known and appreciated. By this arrangement the belts stand still when not at work, avoiding wear and tear, and also saving the power which would be required to keep loose pulleys and belts in motion. The only valid objection heretofore has been that if a friction clutch pulley on the line shaft should slip and need adjustment, the entire line of shafting would have to be stopped for this purpose, or the pulley would have to be thrown out of clutch, losing the work of the machine it was driving until the shaft could be conveniently stopped and the friction of the pulley increased. This objection has been entirely overcome in the "Imperial" clutch pulley. Owing to its manner of construction the friction disk is the only part of the pulley that is in motion when the pulley is out of clutch, the clutch mechanism and the balance of the pulley being loose on the shaft. Therefore, should an "Imperial" driving pulley on the line shaft slip at any time, the pulley can be thrown out of clutch and the adjustment of friction effected without stopping the shaft. This feature is of decided advantage to any establishment, permitting the constant and continuous motion of the line shaft.

The "Imperial" clutch pulley also enjoys freedom from injurious effects due to centrifugal force. The resistance is in direct line with the strain, and, consequently, centrifugal force does not exert a twisting strain upon the clutch members nor throw them out of balance. As the friction rings move parallel to the shaft, centrifugal force cannot accidentally throw the pulley in or out of clutch. The permanent balance of the clutch mechanism and pulley being assured, and centrifugal force having no effect on the action of the pulley, there is apparently no limit to the speed at which the clutch may safely be driven.

The large friction surfaces and the manner of applying the friction make the pulley very positive and reliable in action, and it will transmit all the power exerted by a belt of the size for which it is made. The "Imperial" friction clutch pulley is free from complicated devices, has few parts, occupies comparatively small space on the shaft, is light running and powerful. The fact that it combines all of the essentials of a first-class pulley, with freedom from difficulties heretofore encountered with other makes, should make it a most attractive appliance and ensure its widespread adoption. Further particulars, estimates, etc., will be cheerfully furnished by the manufacturers, Messrs. J. W. Penfield & Son, who also produce a full line of power transmitting machinery of all kinds at their extensive works at Willoughby, Ohio.

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The times are getting better, Senate or no Senate.

What has become of the great outcry of former times against the trolley poles and wires? These "unsightly" and "dangerous" things seem to be having quite a rest.

Winter and the snows thereof, the biting wind, the banks of fleecy flakes, the sleety trolley wire and its attendant annoyances are at hand. Have you purchased your electric snow-ploughs?

Rumors grow that new and important developments in the electrical industry may occur about the first of the new year. We know a thing or two but can only advise our readers to wait and see.

Here we are nearly at the end of 1893. The past six months have been vicious ones, and the glimmering light is only now visible through the clouds of financial obscurity. The Fates and politicians grant that such another time be far distant.

You very seldom hear of a man standing thoughtlessly in the way of the Empire State Express. What this train is to the ordinary accommodation service the trolley car is to the horse car. Rapid transit demands rapid time. "Look out for the locomotive."

The Senatorial Club at Washington is having fun with the most important question that has affected this country for years. In the mean time industrial prosperity is suffering. Let the manufacturing world elect our senatorial representatives and we will have action. A point for the future.

We publish in this issue Prof. Edwin J. Houston's presidential inaugural address before the American Institute of Electrical Engineers, in which he dwells in an able manner upon the World's Fair Congress of Electricians. It is interesting to note that Professor Houston's criticisms of the management and arrangements of the Congress coincide exactly with those already expressed by the ELECTRICAL REVIEW, which was the only American electrical journal which had the temerity to criticize the Congress. Professor Houston again agrees with us that the results obtained by the meeting of these eminent electricians were generally satisfactory, and will be productive of much good in the future.

The street railway interests in convention at Milwaukee this week should take decisive action in the direction of protecting their rights of way. Laws should be asked for making it illegal for children to play on the tracks of electric roads. Rapid transit is demanded by the public, the electric railways are giving it, and were it not for the accidents reported from time to time there would be comparatively no opposition to these new roads. In more than a majority of instances, we are convinced, these accidents are the fault of carelessness on the part of the victims. This could be largely restricted by proper laws. Let the convention ask for them now.

Fancied security is even worse than actual danger; the latter may be avoided, the former is delusive. A fender on a trolley or cable car is a preventive, and it should be a protective device. If it is neither one nor the other it is a snare, and an imperfect fender is more dangerous than none at all. Several attempts have been made recently to install fenders on the Broadway cable cars. They are odd looking affairs, and, from all appearances, of poor mechanical construction. The conditions are such that a simple and efficient pneumatic-tired basket, placed on the car so that a fall into its protective embrace would not mean dislocated limbs, would fill the bill. These constantly recurring accidents should be stopped immediately, and nothing will aid the work better than a sound principle, which already exists, and good mechanical construction, which should be of primary importance.

RECENT ADVANCES OF ELECTRO-THERAPEUTICS.

Dr. Augustin H. Goelet, president of the American Electro-Therapeutic Association, at their recent annual meeting, held in Chicago, spoke quite glowingly of the progress and advancement of electro-therapeutics into the science of medicine. He maintained that electro-therapeutics must contend with the natural opposition by the profession to every new inroad upon old and established methods. Nevertheless the progressive spirit of the association was manifested by the eager way in which the committees appointed to look after their affairs took charge of the work, six committees having been employed in investigating scientific questions having important bearing on the subject. He recalled the fact that within the past five years scarcely a year had elapsed without the development of some new and important feature involving the application of electricity to medicine in some one of its forms. As an instance of this, he cited the development of metallic electrolysis and its extensive application; also the alternating current of D'Arsonval and the capabilities of the interrupted induced current obtainable from modern apparatus. He dwelt on many of the other applications, and in conclusion he declared that by conjoint efforts electro-therapeutics would be brought to that scientific plane which would make its most strenuous opponents its most cordial supporters.

Electro-therapeutics has not been affected materially by the constant onslaughts upon electro-quackery, the two terms have really nothing in common with each other. Electro-therapeutics has before it a most glowing future, while nothing but a miserable darkness into obscurity awaits electro-quackery. The contrast is more striking because of the great but unsuccessful efforts made by the quacks to ingratiate themselves into the confidences of an innocent public. The range of the honest applications of electricity to medicine is vast, and it would be anything but right to allow the minority to obstruct in any way the natural yet twin growth of these two sciences. The application of electricity has and will continue to take the place of drugs and harmful operations, and it cannot be too soon before the entire medical fraternity recognize its value and uses, as we are glad to say, they are slowly but surely doing.

LETTERS FROM A LABORATORY.—LXVII.

BY JULIAN A. MOSES.

The meek inventor has often had ascribed to him a certain amount of guilelessness. As the true and enthusiastic inventor seems to have his mind completely filled with his pet schemes and theories, there is little room for suspicions; and this belief in the child-like character of this individual is not altogether unfounded. In the great social divisions of capital and labor, the inventor can hardly be classed among the former; while it is true that his brains may be called capital, he is nevertheless, to a certain extent, dependent on the capitalist. His ideas could never take shape without the intervention of capital. In other words, in order to produce the best results, a combination of these two classes ought to be made. An amount of interdependence exists which cannot be avoided. Harmony should be had at any cost, and this is most essential to the inventor, for of what value is his invention, no matter how useful it may be, if the capitalist refuse to take hold of it.

Our constantly increasing patent office records show that there is no end to valuable inventions daily tending to reduce our wants and fill our increasing needs. The inventor, however, who has what is termed a good thing, is obviously better able to get capital than is he whose machine or process is of only mediocre value. It would, therefore, seem, if competition is not too great, that when an inventor sees capital ahead he should consider himself fortunate.

Out of the half a million patents now in existence how many of their owners have received much pecuniary benefit? Their sum would not amount to a figure of four places. The rights of an inventor as imagined by him are legion, but the capitalist furnishing the wherewithal believes that he should rule. Very often the former condition exists, but in the majority of cases the capitalist taking the risk, his is the controlling interest. How unwise, then, is the inventor who, seeing before him a sufficient amount of capital to further his interest, allows his suspicions to get the better of him, and foolishly believes that he will not receive his just dues, throws his chances to the winds and sinks again into insignificance, perhaps never to rise again into the visual field of a capitalist. The suspicious inventor, to use a homely phrase, generally "bites his nose to spite his face."

There is, too, the other extreme, the incautious inventor. I overheard one recently, who, in the elevated railroad cars, was expounding to a friend in tones loud enough to be distinctly heard at a distance of 20 feet, even while the car was in motion. With careful exactness he described each feature of his invention, produced and sketched numerous drawings, and, finally, in a confidential tone told his companion, to the edification of the entire carload of people, that he was that morning going down to the patent lawyer's to have his claims put into shape and his drawings made.

His entire demeanor was that of a talkative schoolboy who fearing that those surrounding him in a public conveyance or building should miss the opportunity of knowing who, and what he is and is not, makes it his business to inform them as soon as possible.

There can be little doubt that had the invention of this talkative individual been valuable, and his detailed description overheard by one of that numerous class of persons who for the sake of courtesy we might call "adapters," this combination of circumstances would have led to an unfortunate condition of affairs for the poor inventor. As it was he deserved to lose his right to his invention for being so garrulous.

Many instances could be cited showing how a talkative inventor had given away his ideas just for the sake of being sociable. In the inventor's career, as in everything else, a middle course is best. The too quiet man is just as liable to lose as much as the too talkative, and oversuspicious individual as much as the guileless one.

While the poor inventor, sometimes, to keep body and soul together, must look out primarily for number one, he should not forget that there are others on whom, perhaps, he is dependent, who are as worthy of consideration as himself. A happy medium is best.

The Union of Electrical Engineers of Germany.

FIRST ANNUAL MEETING AT COLOGNE IN SEPTEMBER—INTERESTING REPORT OF PROCEEDINGS.

(From a Regular Correspondent.)

Germany already possesses several electrical institutions dealing with purely technical matters, as, for instance, the Elektrotechnische Verein in Berlin, and similar but smaller societies in Cologne, Frankfort-on-the Main and in other towns. A few months ago, however, a new departure was made by the formation of an institution termed the "Verbund der Elektrotechniker Deutschlands" (Union of Electrical Engineers of Germany). The object of the society, which is to deal with both commercial and technical matters, is to bring about a more intimate connection between German electrical engineers and local authorities, and to afford a permanent representation of the common interests of the profession. This object is to be attained by holding annually a meeting of the members for the reading of papers and the discussion of subjects of current interest. The *locale* of the society is in Berlin, and any one in Germany who is practically or scientifically engaged in electrical work may be a member, as may also the representatives of local authorities, municipalities and technical societies generally.

The following is a brief summary of the proceedings of the Union at the first annual meeting, held at Cologne on the 27th, 28th, 29th and 30th of September:

Combining pleasure with business, as is customary with German technical societies, the members assembled in large numbers, together with their wives and friends. On the evening of the 27th the Cologne Elektrotechnische Gesellschaft received the early visitors to the number of over 100, and on the following morning, when the work of the Union was commenced, the attendance was very considerably augmented—so much so, that the large hall of the Casino Society was crowded. Dr. Slaby, president of the Union, presided over the meeting. After explaining the objects of the Union, he stated that the most important condition necessary to the life of the electrical industry was freedom for development, and that they would fight for that with the instrument of science, the weapon of enlightenment and with the courage of conviction.

After various congratulations had been exchanged, Mr. Sluzewski presented the first annual report. This showed that whereas on the establishment of the Union in January last there were only 34 members, at the present time the number had increased to no less than 762 members. Dr. Slaby was re-elected president for the ensuing year, with Mr. Wilhelm von Siemens and Mr. Rathenau as vice-presidents; and a council of thirty members, including Dr. Budde, Mr. T. Guilleaume, Dr. Heim, Messrs. Lahmeyer, Ocar von Miller, Naglo & Pollak, Dr. Strecker, Mr. F. Uppenborn (editor of the *Elektrotechnische Zeitschrift*), and Mr. A. Wilke, was appointed. It was decided to hold the second annual meeting in 1894 at Leipzig, and a resolution was passed to the effect that the members of the Union, on certain conditions, agreed to participate in the exhibition to be held in Berlin in 1896.

In a paper dealing with the charging of accumulators by means of alternating currents, Mr. Pollak said that it was desirable in many cases to tranform into continuous current at the place of consumption, the alternating current produced at and transmitted from the generating station, so that the former might be used to charge accumulators and energize direct current motors. Experiments made in this direction had not, he remarked, hitherto led to practical results; but he had succeeded in this object by the construction of a "direct current dresser." The principle, as described by the author, is to convert, by the use of the current dresser, the alternating current into a pulsating continuous current. The apparatus consists of a commutator driven by a small synchronous alternate current motor. The alternating current is led to two rings arranged on the axis, whilst the continuous current is collected by means of adjustable brushes, the collection being effected without any sparking. In the charging of accumulators by this current, regulation is only necessary at the commencement and at the end of the charge. An average efficiency or useful effect of 98 per cent. is stated to have been obtained by careful measurements. The "dressed" alternating current cannot, in working, be distinguished from a directly produced continuous current. Mr. Pollak believes that this method will also be of great utility in the working of electric tramways and railways; the current to be sent out at high pressure, then converted down and changed into continuous current. The apparatus is claimed to be simple and cheap, and, if necessary, it could be used for turning continuous current into alternate current. The members were subsequently shown this system in operation for charging accumulators.

The Thomson electric welding process formed the subject of a paper read by Mr. Ross, who later in the day demonstrated the process on a practical scale. Dr. Budde then presented a report concerning the proceedings at the recent Electrical Congress at Chicago, special reference being made to the official determination of the units.

At the opening of the proceedings on the 29th, Mr. Ross described the Lagrange and Hobo electrical process of heating metals to a white and welding heat, and which has recently attracted considerable attention in technical journals. This method was shown at work in the afternoon at the accumulator works of Gottfried Hagen in Kalk. The author mentioned what has perhaps not been stated previously, namely, that by the use of this system even the most refractory metals, as platinum and iridium, can be treated.

Chas. A. Schieren

OF CHARLES A. SCHIEREN & COMPANY, NEW YORK, REPUBLICAN NOMINEE FOR MAYOR OF BROOKLYN.

A paper was next presented by Dr. Kallmann on a system of measurment for central stations, but one by Dr. Sack on telegraphy and telephony had to be postponed.

Mr. H. Voigt submitted in a paper certain proposals for the introduction of a uniform size of contacts and screws used in switches, safety appliances and in large apparatus carrying over 50 amperes and up to 1,000 amperes. He suggested the constitution of a commission to deal with the subject; to this the meeting assented, and a commission was formed to deal with the matter and to report on it at the meeting next year.

Dr. C. Heim referred to an apparatus for testing the insulation resistance of non-conducting substances surrounding electric light conductors, or to which the latter are fastened. The apparatus is portable and is contained in a box. It comprises essentially a sensitive galvanometer having two shunts for an eventual diminution of the sensitiveness by one-tenth or one-hundredth, and provided with a resistance of 10,000 ohms. The box also contains a battery of dry cells, the current from which can be regulated as desired. With this apparatus, Dr. Heim states that he can determine insulation resistances from 30 million ohms down to 1,000 ohms; but that it is not applicable to underground conductors. The author also referred to a new lamp rheostat by which one and the same number of glow lamps can be used with currents of widely varying pressures.

The general business of the meeting was shortly afterwards brought to a close, and convivial gatherings and visits to works on that and on the following day terminated the first meeting of the Union of German Electrical Engineers.

Charles A. Schieren Nominated for Mayor of Brooklyn.

At a late hour last Saturday night the Republican city and county convention at Brooklyn, N. Y., unanimously nominated Charles A. Schieren for mayor of Brooklyn. Mr. Schieren is well-known to many readers of the ELECTRICAL REVIEW as the head of the great leather belting house of Charles A. Schieren & Company, of New York city, which was organized in 1868. Mr. Schieren was born in Germany about 51 years ago, and has been a resident of Brooklyn since 1856. He has been connected with the Brooklyn Young Republican Club for several years. Two years ago he was elected its president to succeed Charles A. Moore, and he has been re-elected to that office. Mr. Schieren is a capable and effective public speaker. He had practical experience in politics two years ago, when he managed the campaign of Henry A. Meyer for mayor, and he aided Republican reorganization last Spring.

Wall Street and the Electrical Stock Market.

A reckless effort to excite speculation in the industrial stocks kept the market unsettled until yesterday, when a general collapse followed the failure of the Senate's continuous session.

During the week Edison Electric Illuminating Company's 5s bonds advanced ¾ point and General Electric 5s gained 2½ points.

General Electric closed the week at 43¼, the highest being 46¼, the lowest 42⅛, and a net loss of one point for the week.

Western Union also netted a loss of one point for the week, its highest figure being 83, the lowest 80¼ and the closing 80⅜.

The bank statement was about what had been expected, the gain in specie and legal tenders being $8,332,400. Of this sum, between five and six millions came from the interior, the rest from the Treasury. The very large increase in deposits was due chiefly to these shipments from the West, but, in part, to the expansion of $2,374,200 in loans. The increase in circulating notes is shown to have come practically to an end.

It has been reported from Boston that Mr. Frederick L. Ames is known to have bought about 2,000 shares of General Electric stock just before his death. It is still held by his estate.

New York, October 14, 1893.

Metropolitan Electric Company.

The Metropolitan Electric Company, offices 319-320 Manhattan building, and salesroom 307 Dearborn street, Chicago, recently organized, will make an announcement shortly as to the scope and general plan of the company. In the meantime they are receiving orders for general supplies and N. I. R. wire, with which they are generously stocked.

Western Union Annual Meeting.

The annual meeting of the Western Union Telegraph was held on October 11. The new directors elected were John Jacob Astor, Louis Fitzgerald, C. Sidney Shepard, Oliver Ames, 2d, and J. B. Van Every in place of Norvin Green, H. Weaver, of London, F. L. Ames, Sidney Shepard and Erastus Wiman. The directors re-elected the old officers.

The gross revenues increased $1,272,038 for the year ended June 30. The expenses increased $1,174,548. The increase in expenses was $698,407 on account of the increased messages handled, $421,466 on account of maintenance and $92,408 for miscellaneous improvement.

Report for year ending June 30:

	1893.	1892.	Inc.	Dec.
Gross	$24,978,442	$23,706,404	$1,272,038	.....
Op. ex	17,482,405	16,307,857	1,174,548	.....
Net	7,496,037	7,398,547	97,490	.....
Int. and skg. fund	933,377	930,523	2,854	.....
Balance	6,562,660	6,468,024	94,636	.....
Divs	4,631,819	4,309,638	322,181	.....
Surplus	1,930,841	2,158,386	.....	227,545
Tot'l surplus	6,886,819	13,576,127	.....	6,689,308

Balance sheet:

Accts. payable	$3,087,629	$2,924,383	$163,246	.....
Cash	1,451,536	2,202,275	.....	$750,739
Net floating debt	1,636,093	722,108	913,985	.....
Accts. receivable	1,855,670	2,088,599	232,925	.....
Supplies	407,306	252,721	154,585	.....
Real estate	4,925,821	3,313,918	1,611,903	.....
Stks. and bds. owned	7,709,718	7,627,559	82,154	.....

PERSONAL.

Mr. J. Frank Morrison, of Baltimore, visited New York last week.

Dr. Frederick Bedell is now an assistant professor of physics at Cornell University.

Mr. George H. Seever has received an appointment as instructor in electrical engineering at Columbia College.

Mr. S. A. Douglas, of the Chicago office of the General Electric Company, was among last week's visitors to New York.

Mr. George Bullock, of Cincinnati, president of the Card Electric Motor and Dynamo Company and a director in the Cincinnati Street Railroad Company, was in New York last week.

Mr. Wm. H. McKinlock, of the Metropolitan Electric Company of Chicago, feels that the outlook for business is encouraging, and sees the promise of liberal support for a good, strong company conservatively managed. Evidence of this fact is fast multiplying.

Mr. Eugene F. Phillips, president of the American Electrical Works and Prince of Providence, was among the recent visitors to New York. Mr. Phillips reports a gradual improvement in business, and has had the satisfaction of booking several large orders during the past two weeks.

Accident In a Brooklyn Power Station.

One of the big fly-wheels used in the power house of the Atlantic Avenue Railroad at Third avenue and Second street, Brooklyn, was blown to pieces about 7.20 o'clock in the evening of October 11, while revolving at great speed. The wheel's bursting nearly demolished the power house, partly wrecked a house several blocks distant, broke in doors and windows in other houses, and, besides this, injured three persons. The wheel was 18 feet in diameter and carried a 14-inch belt and weighed about 20 tons. The electric machinery in the power house was instantly stopped and all the cars on the Atlantic avenue lines came to a sudden standstill. The blockade lasted until 9.30 o'clock, when traffic was resumed through aid furnished by the wires of the City Railroad Company. No cause is assigned for the accident. The total damage, it is said, will reach $30,000.

Brush Plant at Baltimore Burned.

The fine plant of the Brush Electric Company, at Baltimore, Md., caught fire during the night of October 13 and was completely destroyed. The company had the contract for city lighting and operated the largest plant in Baltimore, having a capacity of over 1,500 arc and 12,000 incandescent lamps. The city will be in darkness, as there is no other company equipped to supply street lights. The loss to the Brush Electric Company is estimated at $200,000.

Magnetic Telegraph Advocates in Chicago in 1847.

A pleasant faced, smoothly shaven old gentleman, with a sturdy figure and a bright eye, is G. L. Swift, of New York, who is just now visiting Chicago and the World's Fair. Mr. Swift's first visit to the then village of Chicago was made just 47 years ago. The object of that visit was to introduce to the Chicago public of that far away day the wonders of "the magnetic telegraph." It was in July, 1847, that Mr. Swift came to Chicago. With him were Dr. Swift, now the celebrated astronomer of Rochester, N. Y., and the late Ezra Cornell, who afterward became a multi-millionaire and founded the great Cornell University at Ithaca, N. Y. But at that time Mr. Cornell, as well as the rest of the party, was a poor young man.

The New York and Chicago Telegraph Company had been formed in the East a few months before, and Mr. Cornell had taken stock books and started out to secure subscriptions The first telegraph line between Washington and Baltimore had been built for some years, but it had not been altogether successful from a financial point of view, and there were plenty of people who doubted whether it would ever be a thoroughly practical and money-making system. In the West—Chicago was very far west in those days—the electric telegraph was almost unknown and was regarded as a chimerical scheme, interesting and ingenious enough as a scientific experiment, but not at all the thing for hard-headed business men to put their money into. So Ezra Cornell, who in a degree foresaw the future of the telegraph, to make other people see it, engaged the services of two young men who had had some experience in talking to the public. They were George L. Swift and his cousin, the now famous astronomer. George was then but 20 years old and had come straight off the farm to the lecture platform.

In detailing his early experiences Mr. Swift said:

When we got to Chicago we were all pretty hard up; Cornell, the future millionaire, as bad as the rest. He couldn't pay us any salary for exploiting the telegraph, so it was decided that we should hire a hall and charge admission to our lectures. So we three, all young men then, started out first of all to find a suitable hall. It wasn't as hard work as it would be now, for I don't think Chicago had 25,000 inhabitants in those days—at any rate there was only one public opera-house in the town. That was, unfortunately for us, occupied at the time by Christy's minstrels, and we couldn't get it. We looked the whole town over and there wasn't another public hall available. There was just one thing to do and that was to get permission to use the court-house. So we went to see the Mayor and the other authorities and we pointed out to them how at some future day the electric telegraph might make a great metropolis of Chicago. We didn't believe it all then, but look how it has come out! Well, the outcome of it was that we were given the use of the court-house free of charge for a month.

The next thing we did was to go over to the old *Tribune* office and get some handbills struck off. Here is one of them I found before I left home and brought it to Chicago with me.

Mr. Swift produced a bill, yellow with age, of which the following is a copy:

GREAT WONDER OF THE WORLD!

THE MAGNETIC TELEGRAPH
Will be exhibited in the
COURT-HOUSE SATURDAY EVENING,
JULY 31, 1847.

At the solicitation of many ladies and gentlemen, Mr. Swift has consented to give one more lecture, and positively the last he will be able to give in this city.

The entire telegraph, including the galvanic battery, wires and three registers, will be erected in the room and messages transmitted backwards and forwards on the wires in the twinkling of an eye! The audience can see both ends of the line! It will be seen how two persons thousands of miles apart can converse as freely as if face to face.

Any communication which any person in the room will hand to the operator will be sent on the wires and instantly read at the opposite end!

Mr. Swift will likewise give an experimental illustration of the operation of

COLT'S SUBMARINE BATTERY

As a means of national defense, by which this country, at a trifling expense, may defy the combined powers of "nations of the earth" in case of war!

A RAT

Will be taken in the presence of the audience and drowned and immediately restored to life by galvanism, so that it will run around the room as nimble as ever.

After which an opportunity will be given for any person to put on the

MAGNETIC SLIPPERS!

The law of gravity will be suspended by a current of electricity. A rod of iron will be suspended in the air, touching nothing! This is a new and interesting experiment. Mr. S. has likewise purchased at a considerable expense a double reciprocating engine on a new principle, propelled by electricity, but without any magnet!

Explosion of the powder cup! Railroad engine propelled with speed by electro-magnetism.

Mr. S. will explain the causes of the dip of the

MAGNETIC NEEDLE,

And endeavor to give the reason why it always points to the North and South Poles, to the satisfaction of all present.

A SILVER DOLLAR

Will be put in a dish of water and the money given to the person who can take it out.

GUN COTTON

Will be exhibited and a quantity exploded.

The flattering notices given of Mr. Swift's lectures in Eastern cities and Canada induces the hope that he may meet a generous patronage on this occasion. He will endeavor to deserve the attendance of an intelligent class of ladies and gentlemen.

For further particulars see large bills.

Doors open at 7½ o'clock—Lecture to commence at 8. Admission, 25 cents—For lady and gentleman, 37½ cents. Children, half price, when accompanied by their parents or guardian.

Tickets to be had at the book stores and at the principal hotels.

Daily Tribune Print.

Mr. Swift continued:

That hand-bill did us a great deal of good, for the court-house was crowded at 37½ cents a couple. We made money enough to pay all our expenses and to buy a new suit of clothes apiece besides. Ezra Cornell needed a new suit more than any of us. He was really looking pretty shabby.

But, though the lectures were successful, Mr. Cornell did not have very good luck in getting subscriptions to the stock of the New York and Chicago Telegraph Company. He got a few hundred dollars in Chicago and about the same amount in New York. You see he had to go at capitalists in this way:

"Now, here's a new invention. We want to build a telegraph line between New York and Chicago. If the invention works how much will you subscribe?"

On our way back East I stopped at London, Canada West, and received the first message sent over the telegraph line then building west from Niagara Falls. The great trouble in those days was to get power. We used acid batteries, and over a long distance they failed to generate a sufficiently strong current. So two of us learned to receive messages by feeling the wires with our fingers. In this way we could make out a very faint shock.

After leaving Chicago Mr. Cornell held on to a great deal of the stock of the telegraph company and it made him a very rich man. I staid in the lecture field for years and have often visited Chicago since that early day, but I never come here that I do not remember our first meeting in the little old court-house.—*Chicago Tribune.*

The Electric Capstan.

An expert in railway matters declares that the day is not far distant when the switching engine will be entirely done away with, its place being taken by the electric capstan. The latter is already in use to a certain extent on some of the Pennsylvania lines. The motor, which actuates the capstan by means of gearing, runs at the rate of some 1,200 revolutions a minute, and the gearing, motor and switch of the capstan are all contained in a water-tight iron case, the top of which comes flush with the ground; there is a cover to it which is readily removable, so as to give easy access to the motor for oiling and cleaning. The wires containing the current for the motor are carried through an iron pipe below the surface of the ground, and the switch for starting and stopping the motor is operated readily by the foot of the attendant in charge of the capstan.

Recent Observations Concerning the Disturbing Influence of a Naked Buswire on Telephone Lines.

BY C. GRAWINKEL.

A short time ago Postal Counsellor Wabner demonstrated that the busy test in telephone centrals is much interfered with by leakage currents from electric light and power lines. (See No. 17, E. T. Z.)

Later experiments made by the engineers of the German Postal and Telegraph Administration proved, conclusively, that even a low potential difference is amply sufficient to create a considerable disturbance of the lines converging into a telephone central. Desiring to get all possible information on that point, a series of exhaustive tests were carried on in Altona and Hamburg; the reason for selecting these two cities being that in the former the electric light company employs an uninsulated omnibus conductor, while the electric light company of Hamburg uses the insulated third wire.

All measurements were made with a differential galvanometer, having its coils connected in series. In order to secure the best possible results from these tests, they were performed at various hours of the day. The method employed consisted in inserting the galvanometer between the spring jack and ground, there being in the circuit the resistances of the alarm bell at the subscribers station, the line and telephone instruments. Prior to the tests, the galvanometer had been carefully calibrated so that a deflection of

10	degrees	corresponded to	0.022 volts.
20	"	"	0.039 "
30	"	"	0.068 "
40	"	"	0.111 "
50	"	"	0.253 "
55	"	"	0.386 "

It should also be stated that as soon as the galvanometer needle swung 10 degrees, the influence of the leakage current affected the busy test; a deflection of 30 degrees prevented the practical use of such a test.

MEASUREMENTS MADE IN ALTONA.

First Day.			Second Day.		
Time Afternoon	Lines	Deflection.	Time Afternoon	Lines	Deflection.
12–12.20	3	10–29	12–12.20	1	10
7.50–8.5	6	20–46	7.50–8.15	10	10–30
8.50–9.10	12	12–46	8.50–9.10	18	15–45
10–10.20	7	10–43	10–10.15	16	10–47

The above data prove that the leakage from the electric light conductors was greatest at that time of the day, requiring the greatest output of current. Classifying the lines influenced by leakage currents (the deflection being 20 degrees or more), according to the hour of the day, we find for the first day, 1, 6, 8, 4; second day, 0, 4, 13, 14.

MEASUREMENTS MADE IN HAMBURG.

Similar tests were made with 20 lines of the Telephone Central of Hamburg, the result being that the average deflection amounted to only three degrees. In a single instance the galvanometer needle registered a deflection of 10 degrees. In other words, these tests proved that the leakage currents were not of sufficient strength to interfere seriously with the service of the exchange. Another interesting fact is the evenness of these leakage currents, for the deflections remained unchanged at the various hours of the day.

The evidence before us shows that the influence of a naked buswire on telephone lines is much greater than that of an insulated conductor, and it also proves that a naked buswire necessarily interferes with the telephone service. Up to the present the telephone exchange of Altona is comparatively small, so that the operators can get along without the busy test; but as soon as the subscribers increase, the telephone service of that exchange would be seriously obstructed.

It will be remembered that Altona has often been cited as an example of the entire harmlessness of the commercial use of a naked buswire by electric light companies, as far as the telephone service is concerned, but it must be conceded by all fair-minded persons that the above-mentioned tests show the fallacy of such assumption. The fact is proved that the use of an uninsulated buswire, even under normal conditions, is a standing menace to any existing telephone exchange.

Manhattan Day Excursion Trains.

For Manhattan day at the World's Fair, General Passenger Agent Daniels, of the New York Central, announces a rate of $15 for the round trip, good on special trains leaving the Grand Central station on Wednesday and Thursday of this week, at 9.50 A. M., and reaching Chicago early the next day. The outward trip will be made *via* the Lake Shore and Michigan Southern Railway. Returning, the tickets will be limited to special trains leaving Chicago, *via* Michigan Central Railroad, October 23 and 24. A stop will be made at Falls View to afford passengers an opportunity to see the cataract and the rapids above and below the falls. In anticipation of heavy travel the company has arranged to store more than 200 cars at different points along the route. If necessary, the special trains will be run in several sections, each in charge of a tourist agent. Special cars will be assigned for the exclusive use of large parties.

ELECTRIC LIGHT FLASHES.

The general offices of the Thomson Electric Welding and Projectile Company have been moved from the Fiske building, Boston, to its works at Lynn, Mass.

The Marlboro, Mass., Electric Company started the alternating current system last week, whereby they are able to reach all parts of the city for house lighting.

A Westinghouse electric light plant is soon to be put in operation at Lancaster, Pa., in opposition to the Edison. It will be one of the finest equipped light stations in the State.

The Westbrook, Mass., Electric Light Company has a crew of men stringing wires for the incandescent circuit in Deering, and expect to have the lights running some time next week.

The franchise of the Electric Light Company, of Springfield, Mo., expires in a year from this time, and the city council of Springfield now proposes to build and operate their own electric light plant.

It is said that the Blue Hill Electric Light Company, of Canton, Mass., propose to extend their wires to Sharon, provided the people of that town will furnish the necessary capital by subscribing $2,500 to an increase of the capital stock of the Blue Hill Company.

The Indiana Light and Power Company, of Goshen, Ind., went into the hands of a receiver last week, owing to inability to meet its matured bills. The company has in process of construction the Goshen City electric railway and an electric short line between Goshen and Elkhart.

The Homestead, Pa., electric light plant was wrecked last week. The casting which formed the bed of the big engine broke, and the engine smashed all the machinery to pieces. The engine alone was worth $3,200. It will be a month before the plant is refitted, and the borough will be in darkness in the meantime.

Superintendent Martin of the Brooklyn Bridge has reported informally as to his visit to Chicago for the purpose of examining the General Electric Company's traction system, with a view to having it substituted for cable power on the bridge. He thinks well of the system. His complete report on the matter will be submitted next month, expert engineers meanwhile continuing the examination.

The matter of utilizing the water power at Lyons, Mich., for the electric light plant there is still under advisement. The company is in correspondence with expert electricians as to the feasibility and probable cost of the project. Should the plan prove practical and the power obtained be sufficient for the purpose, it is hoped that Ionia's street railroad, for some time anticipated, may become an actual fact.

Page Belting Company's Exhibits at the World's Fair.

The exhibit of the Page Belting Company in Electricity Building is located at Section D, Column 5, where are displayed the various grades of belting they manufacture especially for electrical work, including "Acme" Link and "Eureka Dynamo" belts, the two leading grades made by this company for electrical purposes. They show in operation in this space one of each of these belts, the two running tandem, as indicated in the illustration, and by their use they light their space brilliantly through a large number of incandescent lamps. Among the rolls of Acme link belting is the largest link belt ever made. It is 201½ feet long, 60 inches wide, ¾-inch thick, containing 412,390 pieces of stock and weighing 4,249 pounds. They also exhibit the "Concord" link belting and the "Dynamo Double," cheaper, but good grades of belting for electrical work. In Machinery Hall, at Section F, Column 27, they show a large and varied display of belting designed principally for the transmission of power for general business; especially their "Crown" belting in single and double, and their "light double," the single and "light double" being displayed in full rolls and the heavy double being arranged in the form of a cone, whose base is a 30-inch belt, 300 feet in length. All these belts are waterproofed by the same material as that used in the manufacture of the Allis engine belts, and together they make a fine display. In this exhibit is to be seen in motion the largest belt in the world. It is the "Crown," and is constructed by the use of 569 ox hides. It is 203 feet long, 102 inches wide, three ply and weighs 5,176½ pounds. This belt is long enough, wide enough and strong enough to transmit 8,000 horse-power. Over it is exhibited a pair of horns, the largest in captivity. Other goods displayed are lacing in all its forms, both whole and cut, mill straps, etc.

This company has in operation at the World's Fair more than 300 belts, a large per cent. of which are employed in the transmission of power to electrical machines.

In Machinery Hall, containing that vast collection of wonders in machinery, mechanical appliances and enormous dynamos, the most prominent exhibits are located upon the grand power stand, directly opposite the main entrance from Administration Building. Here are the world-famous Allis engine and Westinghouse generators, each capable of furnishing current to more than 10,000 incandescent, 16 candle-power lamps. On the front of this raised platform, the visitor's attention is attracted by the 30-foot fly wheel of the Allis engine and the two belts running tandem from it to two of the Westinghouse electric generators. The shorter belt, as shown in the illustration herewith, is 148 feet long, three ply and 72 inches in width; the longer belt is 185 feet long, three ply and 71 inches in width. When running these belts excite the admiration of every visitor, as at a speed of 5,600 feet per minute, they transmit to the dynamos more than 2,000 horse power. It was considered by engineers an experiment of doubtful result to run these enormous belts tandem at this speed as nothing of the kind had ever been attempted. But the Page Belting Company did not hesitate. This corporation had recently completed one of the most extensive belt works in the world by a remodeling of their plant at Concord, N. H., equipping their new buildings with machinery of the heaviest and most improved patterns, including the largest hydraulic leather belt press in the world, which has a capacity of 660,000 pounds pressure; also including a special machine by which belts as large as these, and even larger, can be subjected to a crucial test before leaving the factory. With these facilities these Allis engine belts were built, tested and placed in position for Exposition services, presenting to the pulleys, by reason of their even thickness, the most perfect contact possible, thus enabling them to easily transmit an enormous amount of power, and at the same time to run without perceptible flap or vibration. They are the "Crown" brand and are water-proofed by a special material containing no oil or acid, which greatly adds to their ability to transmit power while running slack.

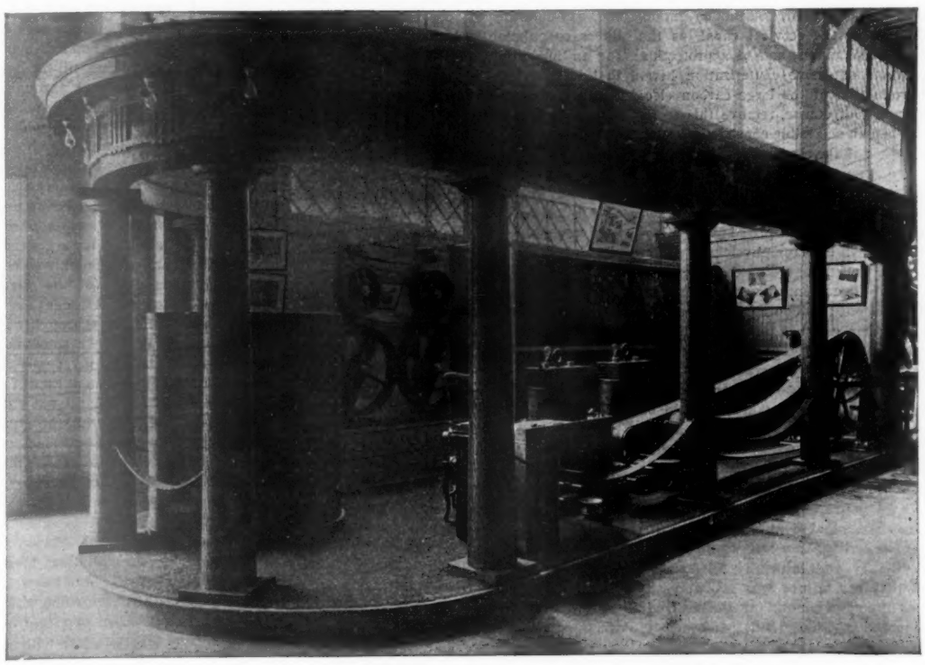

FIG. 1.—PAGE BELTING COMPANY'S EXHIBIT, ELECTRICITY BUILDING, WORLD'S FAIR.

On the grand power stand are also a 65-inch three-ply "Crown" belt, transmitting 1,000 horse-power; two 24-inch "Eureka Dynamo" belts, each transmitting 400 horse-power at a belt motion of 6,250 feet per minute; two 15-inch and two 5-inch "Eureka Dynamo" belts, all of which are furnished by the Page Belting Company. These large belts have never been touched since they were put on the pulleys and they will not require taking up or any other repairs during the term of the Exposition.

In front of the grand power stand are the two largest link belts running at the Exposition. They are furnished by the Page Belting Company and are their "Acme" brand, three-quarters of an inch thick, 30 inches wide, transmitting 250 horse-power each at a belt motion of 4,560 feet per minute. From one of the Woodbury engines, east of the grand power stand, are driven two of their "Eureka Dynamo" belts at 4,500 feet per minute and transmitting each 300 horse-power; while from another Woodbury engine, in the same section, are driven two 18-inch "Acme" link belts at 4,600 feet per minute. In the intramural railway station only one belt is used, a 48-inch "Crown" double, furnished by the Page Belting Company, transmitting more than 800 horse-power. Among the other belts supplied by this company are all the belts used by the General Electric Company, Electric Forging Company, J. A. Fay & Egan Company, Niles Tool Works and many other large exhibitors of electrical and general machinery.

This is the 25th year of the company's business and they publish a very neat and instructive anniversary souvenir, which is distributed at both their exhibits.

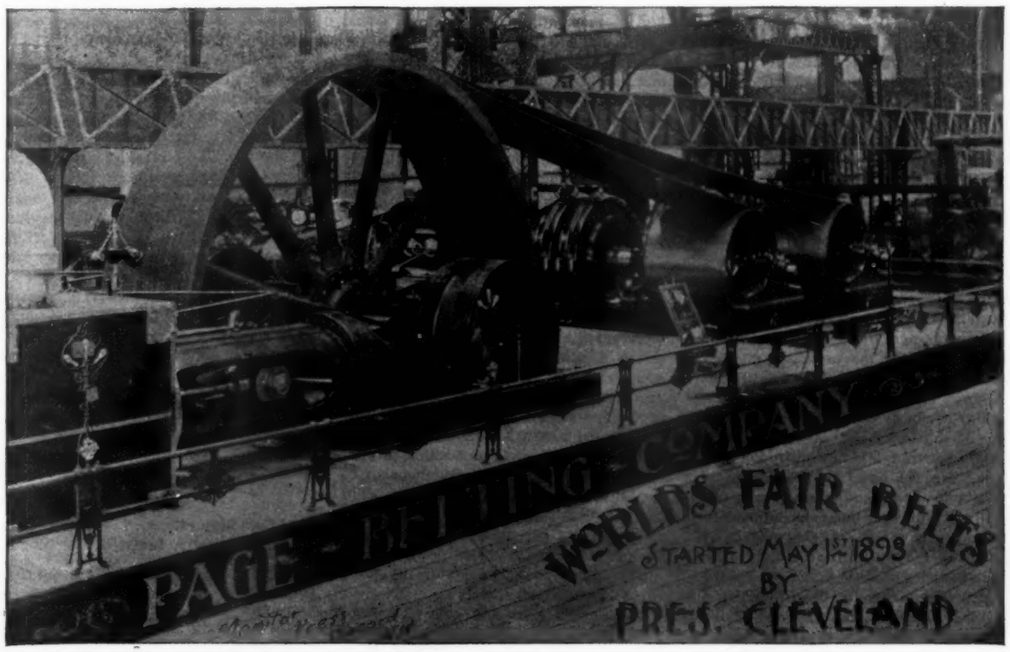

FIG. 2.—PAGE BELTING COMPANY'S LEVIATHAN BELTS RUNNING TANDEM FROM THE ALLIS ENGINE AT THE WORLD'S FAIR.

TELEPHONE CHAT.

The telephone line from Jacksonville to Readsboro, Vt., hasbeen undergoing much needed repairs.

The Ohio State Board of Assessors and Appraisers has apportioned the valuation of the property of the Central Union Telephone Company among the various Counties of the State. The total valuation is $429,717.

An agent of the New England Telegraph and Telephone Company has been in Wakefield and Reading, Pa., the past week, soliciting orders for telephones. The company propose to establish an exchange and circuit in Wakefield and vicinity, provided 35 patrons are obtained in the two towns.

There is a telephone war on in Haverhill, Mass. The aggressive parties are the physicians, and 10 of their number have signed a petition to the New England Telephone Company, declaring that if the service is not made satisfactory, they will order their instruments removed. They further hope to secure the co-operation of the druggists.

The raise in price made by the Southern New England Telephone Company has caused the Hartford, Conn., Transportation Company to take out six of the instruments used by them at points down the river. A raise in price is invariably followed by the giving up of the 'phones by their lessees, and the move does not seem to result profitably to the company.

Why Electricity Sometimes Fails to Control Uterine Hemorrhage.

A LECTURE DELIVERED AT THE WEST SIDE GERMAN CLINIC IN THE COURSE OF CLINICAL INSTRUCTION IN GYNECOLOGICAL ELECTRO-THERAPEUTICS—BY AUGUSTIN H. GOELET, M. D.

In a former lecture I told you that one of the principal uses of the constant current was for the control of uterine hemorrhage, and showed that this was obtained by electrolysis of the tissues in contact with the positive pole. I will reiterate that contact, not instantaneous, but more or less prolonged, is absolutely essential in the majority of instances to produce this result. That is to say, while moderate hemorrhage from the uterus may sometimes be controlled by the application of the ball electrode connected with the positive pole in the vagina, it is more often necessary for a bare metallic or carbon electrode to come into actual contact with the endometrium. The reason for this is obvious when you recall the fact that electrolysis is more pronounced at the location of the poles, *i. e.*, where the electrode is in contact with the electrolyte. The action which brings about this result (the control of hemorrhage) is due to several things operating together; first, an electrical osmosis, which takes place in the direction of the current from the positive to the negative pole, whereby depletion with paling and drying of the tissues in the vicinity of the positive pole is produced; second, the congestion or blood stasis of the uterine body or attached fibroid mass is relieved; third, the detachment of adhesions between contiguous peritoneal surfaces, which is one of the first results observed from the use of the current, allows the mass to rise in the pelvis and removes one of the causes of obstructed circulation; fourth, cauterization and destruction of the diseased endometrium, resulting from the liberation of oxygen, chlorine, acids, etc., at the point of contact of the positive pole with the tissues, produces eventually a dense, unyielding eschar, which acts as a barrier against subsequent bleeding.

One of the most frequent causes of failure to control uterine hemorrhage with this agent is due to imperfect and insufficient contact of the electrode with the whole endometrium during the application. This may be due to a faulty method of application, or a condition of affairs may exist which will preclude the possibility of placing an electrode in contact with every portion of the endometrium, in which case failure is unavoidable. The platinum sound electrode, which is constructed so as to expose any length of metallic surface desired, according to the length of the canal, that the whole canal from the external os to fundus may be exposed to the local action of the current, is necessarily limited in usefulness, because its diameter is so small that contact with the walls of the canal is only possible when the canal is narrow and not dilated. Therefore, the attempt to control hemorrhage with this electrode where the cavity is dilated, or where its diameter is abnormal, will prove a failure. If the canal is tortuous, or the caliber is almost obliterated by the projection of an interstitial fibroid into the cavity, or if a sharp angle is formed by the fundus being dragged down by the weight of a fibroid in the upper portion of the uterine wall, it will sometimes be impossible to introduce any kind of electrode the full length of the canal. It often happens that the portion beyond the constriction or obstruction is greatly dilated, while that below is of moderate caliber, and, if it was possible to introduce an ordinary electrode beyond, effective cauterization would not be possible, because of imperfect contact with the walls.

When the cavity is too large to permit the platinum sound being used satisfactorily, the carbon electrodes, which are of different size, are employed, and the cauterization is done in sections. A size is selected which will fit the caliber of the canal, and it is passed to the fundus, where it is allowed to remain for five minutes while the current is turned on; then, without turning off the current, it is withdrawn a certain distance and another section of the endometrium is submitted to the action. This is repeated until the canal of the cervix is reached, which should not be submitted to the caustic action of the current with the large carbon electrode, as stenosis would surely follow. When the platinum sound is used, it is not so important to exclude the cervical canal, as the plug of cervical mucus acts as a protection and prevents extensive cauterization here. The introduction of the large carbon electrodes would, of course, remove this secretion. When an accessible constriction, such as narrowing of the cervical canal, prevents the introduction of a carbon electrode of sufficient size to fit a dilated cavity above, I dilate with a steel dilator.

I have been much surprised at the ignorance displayed by some physicians, otherwise well informed, regarding the manner of the action of the current upon the surface to which it is applied to control bleeding, and this is another cause of failure, for which, however, the agent is not responsible. It, nevertheless, frequently operates against its more extended application in these conditions, as well as in others where it could be used with benefit if intelligently employed. For instance, a remarkably well-informed gynecologist once said to me that he had no confidence in any of the statements concerning the value of electricity in gynecology, because it had failed completely to control uterine hemorrhage in a case where he had conscientiously and faithfully tried it. I replied that his failure was probably the result of imperfect contact of the electrode with the endometrium, and, consequently, ineffective cauterization of the whole surface.

"Oh! no," said he. "I am sure that I cauterized the whole surface, because I was very particular to move the electrode freely about in the cavity so all parts would be touched by it."

"Did you," said I, "hold the electrode still in one place for five minutes and then move it to another, and so on until the whole surface had been included, or did you keep the electrode moving about?"

He replied, "I kept it moving all over the surface, of course, so as to be sure no spot was omitted."

I had some little difficulty in convincing him that an intra-uterine electrode should not be used as a curette, and that it in no way resembled the actual cautery or stick of lunar caustic, which takes effect as soon as it touches; but that, on the contrary, the cauterization was due to a chemical action, resulting from decomposition of the tissue elements, which could not occur to any great extent instantaneously, but required prolonged contact. To convince him, I had to remind him that a red-hot coal could be rolled about in the hand without injury if the motion was rapid. As this conversation took place within the last two years it appeared to me an unwarrantable unfamiliarity with a subject which has been so freely discussed in medical literature. Doubtless, many other failures have occurred in the same way, and many other physicians are deterred from using a valuable therapeutic agent, because errors of a similar nature have caused them to have no confidence in it.

Another cause of failure which in some instances may cause its abandonment, is the attempt to check hemorrhage while the bleeding is very active. This will nearly always fail (though it is sometimes possible), because the blood flows away so rapidly around the electrode that the chemical action on the tissues is prevented. The action is expended upon the blood filling the cavity, which is constantly refilled as it becomes emptied, and the result of the decomposition is constantly being washed away. The most appropriate time for the application in the case of hemorrhagic fibroids when it will be productive of the greatest benefit, is during the interval when there is no bleeding. However, if the applications are persevered with and are properly made they will, in the majority of cases, control an active hemorrhage, but success should not be expected from one or two or several applications at this time. It is here that I think Gautier's cupric electrolysis is particularly appropriate. It may be employed in the midst of an active bleeding with certainty, since the decomposition of the copper electrode by the action of the positive pole liberates an astringent salt, the oxy-chloride of copper, which produces coagulation. An additional reason for an immediate result lies in the fact that it is driven into the tissues by electrical osmosis, and the structures for some distance beneath the surface are stained by it. No harm results from the absorption of this salt, as Gautier showed by experiments upon rabbits. This will be borne out by the observations you have been able to make upon the patients you have seen treated here by this method. You have seen it control hemorrhage when curetting the uterus and packing the vagina with cotton have failed, or when they have only controlled it temporarily. You will recall the patient, Mrs. K., who was here on the last clinic day. The hemorrhage, which had recurred after the use of the curette and washing out of the cavity with a strong solution of iodine, you observed, was promptly and permanently controlled by cupric electrolysis. I suspect malignant disease in this case because the bleeding was so profuse and uncontrollable when the curette was used, and because I found that the cervix had been amputated in some other institution about eight months before.

I make no objection to curettement. It has its uses and possesses many advantages. You have seen me make use of it when I thought it more appropriate than the other measures we usually employ here for the control of hemorrhage. The application of the current in these cases possesses this advantage over the curette, however, that it can be employed in office work, and an anæsthetic is never required.

These remarks will prepare you for some of the failures you may expect, and enable you to turn them into success in some instances. They may likewise enable you to correct some unfavorable criticism you may have regarding the value of this agent.

Artificial India Rubber.

Artificial india rubber from cotton-seed oil is one of the latest industrial products, and claimed to possess commercial adaptations of peculiar practical value. The manufacture involves a process not yet given out to the public by the discoverer, who states that, while experimenting with the cotton-seed oil to produce a varnish for painting, he obtained a substance entirely foreign in its make up and properties to what was sought —not a varnish, but rubber. So simple is the process, as alleged, that it is not within the protection of a patent—the only safeguard being, therefore, in the secrecy of the process, by the use of which, it is asserted, only 15 per cent. is required of the genuine rubber to produce an article which can in no way be distinguished from the ordinary crude india rubber, it is said, even by experts in the handling of the latter article. Arrangements have been made for its extensive manufacture and its application to the various purposes so long peculiar to the natural material.—*The Tradesman.*

The Canadian General Electric Company, Limited.

Circulars have been recently issued from Toronto, Ont., announcing that the Canadian General Electric Company, Limited, has purchased the entire electrical manufacturing business, including patterns and good-will, of the Ball Electric Light Company, Limited. The Canadian General Electric Company will continue the manufacture of Ball apparatus, including the Ball new "1893" model arc lamp, at their extensive Peterborough works. Mr. W. A. Johnson, late manager of the Ball Company, will be connected with the Canadian General Electric Company as head of the arc lighting department.

A Man Who Can Hear Induction.

BY JULIUS CHAMBERS, IN THE NEW YORK "RECORDER."

"You really interest me very much," I said. "What are these sounds you say you hear that are inaudible to other fellow mortals?"

"It would be difficult to render you a catalogue of them all. I can soak a grain of corn in water, lay it upon a dish and hear its groaning and creaking till the live germ bursts its shell. I can walk through a field of wheat and distinctly hear the noise of the attrition of the grains in the golden ears. Strangely enough as I travel by boat I hear the grating of the ships hull against its fluid surroundings rather than the eternal clanging of the ponderous engines. Gazing up at the telegraph wires it has always seemed to me that I might read the messages that were passed upon them. In Brooklyn I certainly can hear the induction of the wires that pass down Fulton street under the elevated road. There I find a thoroughly isolated sound, to the human ear something like escaping steam, but to my neatly attuned tympanum a wholly different kind of noise."

"I have often heard that it was quite possible for some men to read the quotations on the stock tickers without looking at the tape. Indeed, I used to know a man who could do so—William McCausland, of Philadelphia. I wonder if you could undertake to do this?" I suggested.

"I am quite ignorant of the mechanical construction of the printing telegraph," replied Fosdick. "I do know that it has a unison point, from which almost any acute ear ought to be able to count the letters or ticks, and thus pick out the words as they are rapped out. This not only requires a very alert ear and brain, but the man who can do it must also possess a considerable knowledge of the stock market and the mechanical construction of the printing telegraph machine."

My strange friend concluded his conversation by telling me of his experience in taking a deaf and dumb friend to see a famous magician. Fosdick had long been an ardent admirer of the prestidigitateur, and believed that in taking his afflicted companion he would be doing his friend a real service; but after a few minutes the mute took occasion to write upon his slate that he was no longer interested in the show, because he could readily discern how every one of the tricks was executed. Not possessing the power to speak or the sense of hearing, his entire intelligence had been concentrated in his eyes, and no bit of palming or sleight-of-hand work was rapid enough to escape his acute mentality. Whenever the clever magician walked behind his table to exchange the silk hat that had been borrowed from the audience for the "stovepipe" that contained the rabbits and dolls, the deaf and dumb visitor could always detect the act of substitution.

This, to me, was a revelation quite as strange as that made by Henry Fosdick himself. If men with overtrained and unduly sensitive faculties can see, hear or smell so many things which we ordinary mortals fail to detect, they dwell in a very different world from us, though they walk our streets and talk our language.

Electric Lighting in Servia.

Some of the principal streets of the capital of Servia—Belgrade—are now lighted by electricity. The work has been carried out by the Franco-Servian Town Improvement Company. A concession has also been granted to Messrs. Ganz & Co., of Budapest, for a central station for private lighting purposes.

Representatives of an electric company were in Provincetown, Mass., recently, and conferred with prominent business men as to the advisability of establishing an electric plant for a street railway and lighting the town. The project as outlined calls for an estimated outlay of $75,000. The electric company will invest $40,000 if the remainder of the stock be taken by people of the town.

ADVANCE INFORMATION.

New Electric Companies Formed and Important Constructions Projected.

VALUABLE INFORMATION FOR MANUFACTURERS AND DEALERS.

We publish below the earliest information obtainable relating to new electric railways, new electric light companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW from week to week.

New Electric Railways.

MERIDEN, CONN.—The Meriden Horse Railway Company is letting contracts for the electrical equipment of its horse car lines. The Thomson-Houston system will be used. W. P. Douglass, of Philadelphia, recently purchased a controlling interest in the company.

PHILADELPHIA, PA.—Surveys have been completed for the proposed West Chester and Philadelphia Electric Railway. The distance is 23 miles.

BATAVIA, N. Y.—An electric railway will be constructed from Batavia to Depew. HON. W. J. Holmes, of Batavia, and a corps of assistants are now at work surveying the proposed route.

TRENTON, N. J.—The Trenton Passenger Railway Company is an applicant for permission to use electricity as a motive power in all its branches.

PEORIA, ILL.—The Peoria and Pekin Rapid Transit Company has had the time for building its proposed road extended to May, 1894. The company states that it cannot dispose of its bonds at this time.

CONWAY, MASS.—The promoters of the proposed electric railway, from Conway station to the village, have petitioned the legislature for a charter.

GUTHRIE, OKLA. T.—The Enid and Perry Railway Company; capital, $500,000. Incorporators, E. L. Dunn, R. W. Patterson, C. O. Wood and J. W. Thompson, of Enid, and James A. Pearce, of Denver, Colo. The company will build an electric line between the cities of Enid and Perry, in the Cherokee strip, a distance of 40 miles.

COVINGTON, KY.—Articles of incorporation of the Cincinnati, West Covington and Ludlow Street Railroad have been left for record in the County Court. The object is to build a street railroad between Covington and Ludlow, and it is to be completed on or before the 2d day of October, 1894. The capital is $75,000.

PORTLAND, ME.—The Electric Car Ventilating Company has been organized by Francis Proctor, president; Loring B. Haskell, treasurer; and B. G. Ward.

HARTFORD, CONN.—Articles of organization have been prepared incorporating the Connecticut Royal Arc Electric Company, a branch of the Royal Arc Electric Company, of New York City.

BARTOW, FLA.—The Clear Spring Phosphate Company has been formed by Pittsburg, Pa., capitalists. The company proposes to work phosphate beds at Bartow, and is considering the possibility of using electric motors on its dredge boats.

LUZERNE, PA.—The projectors of the electric road from Luzerne to Dallas are pushing the work of securing right-of-way and making arrangements for the construction of the line.

MONTREAL, CANADA.—The Montreal Street Railway Company will increase its capital from $2,000,000 to $5,000,000.

HUNTSVILLE, ALA.—The proposed electric railway between East and West Huntsville will be built at once.

RICHMOND, VA.—The electric street railway to Barton Heights suburbs has been completed and opened for traffic. It is operated by the Richmond Railway and Electric Company.

SAN ANTONIO, TEXAS.—It is reported that the San Antonio Street Railway Company has purchased the property of the Citizens' Street Railway Company.

MONTREAL, CANADA.—The Municipal Council of Outremont has granted a 30 year exclusive electric railway franchise to the Montreal Park and Island Railway Company. This will form part of the company's route around the mountain and through Notre Dame de Grace.

SAN FRANCISCO, CAL.—A combination of street railways, which has been in progress for some time, is at last completed, with a capital of a little over $18,000,000. Of this the Southern Pacific controls 76 per cent., and the remaining 24 per cent. is divided between the ferries and the Cliff House road, the Omnibus Company and the North Beach and Mission roads. The combination includes 16 street car lines, operated by electricity, cable and horse-power.

Electric Light and Power.

RUSSELLVILLE, KY.—The city council has granted a franchise to W. F. Browder, A. C. Hodgen, D. Evans, S. V. Leedom and others, to erect an electric light plant, and has contracted for lighting the city. The plant will be built immediately, and is estimated to cost $10,000.

MORRISTOWN, N. J.—The Lewis Electric Company; capital, $1,000,000. Incorporators, I. N. Lewis, of Fort Wadsworth, Staten Island, N. Y.; W. S. Fanshaw, of Westchester, N. Y., and H. E. Fanshaw, of Morristown.

PHILADELPHIA, PA.—The electrical committee councils recommend that $219,500 be appropriated for the Electrical Bureau for 1894. The sum includes $25,000 for locating electric lights, poles, etc.; $30,000 for cables, conduits, etc.; $22,000 for laying a main conduit in Ridge avenue, and the balance for salaries and the general operation of the Bureau.

TRENTON, N. J.—The New Jersey and Pennsylvania Power Company will erect a large electric plant to be operated by water power. The work of building the dams and sluice-ways will begin at once.

New Manufacturing Companies.

CHICAGO, ILL.—The Pullman Electric Company; capital, $25,000; to manufacture machinery. Incorporators, Frederick A. Pullman, John M. Atkinson and David Reid.

JERSEY CITY, N. J.—The Progressive Power Company; capital, $300,000. Incorporators, J. H. Batt, of Montclair; W. K. Lathrop, F. G. Wheeler, and J. P. Lowrey, of New York city. The company will construct boilers, engines and appliances for the production of light, heat and power.

MINNEAPOLIS, MINN.—Articles of incorporation have been filed by the Electric Heat Regulator Company, with capital at $40,000. The incorporators are John H. Ames, of St. Paul; Andrew B. Robbins, W. F. Decker, William R. Sweatt and C. A. Magnuson, all of Minneapolis.

ST. LOUIS, MO.—The Western Supply Company has increased its capital from $5,000 to $25,000.

PHILADELPHIA, PA.—The Overbrook Electric Company, capital, $10,000; incorporators, Herman Wendell, of Wayne; Walter B. Smith, of Overbrook; John Lowber Welsh and James W. Paul, Jr., of Philadelphia.

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KINDRED INTERESTS

The H. W. Johns Manufacturing Company, of New York, is represented at the Street Railway Convention this week by E. B. Hatch, of Hartford, W. F. D. Crane, of New York, and H. A. Reeves, of Chicago.

The New Home Sewing Machine Company, at Orange, Mass., have placed the contract with the Berlin Iron Bridge Company, of East Berlin, Conn., for a new foundry and tumbling room. The building will be entirely of iron, 45 feet in width and 120 feet in length.

The Field Engineering Company, New York, have issued a very tasteful pamphlet entitled "Vertical Multi-Cylinder Lake Erie Engines." The pamphlet contains illustrations and descriptions of engines for electric service, built by the Lake Erie Engineering Works, for whom the Field Engineering Company are eastern representatives.

"M. V." Ammeters and Voltmeters.—Queen & Company, incorporated, of Philadelphia, are much gratified because of the recent award granted to them for "Magnetic Vane" ammeters and voltmeters, because of "excellence of design and construction and convenience in use." There is no question but that these instruments are well adapted to constant switchboard service, such as is required in central stations and isolated plants. A number of construction companies have adopted them to install with dynamo machinery, and the makers will be glad to furnish further particulars to interested parties.

GENERAL NOTES.

Work has been commenced on the new electric light building at Port Deposit, Md.

John D. and A. B. Spreckels have $350,000 in an electric street railway at San Diego, Cal.

The telephone line between Ellsworth, Me., and Castine, South Penobscot and Penobscot is completed.

The telephone from North New Portland to Eustis, Me., by way of Flagstaff and Stratton, 48 miles, is completed, all but putting in the instruments.

The connection with the long distance telephone and the exchange at Lima, O., was made October 4. The line was tested and found to be all right.

Ground was broken for the electric street railway, at Middletown, N. Y., on October 9. When the road is completed it will connect Middletown with Goshen, N. Y.

The Westbrook, Me., Electric Light Company has a crew of men stringing wires for the incandescent circuit in Deering, Me., and expect to have the lights running some time this week.

The Richmond, Va., Railway and Electric Company has nearly completed the work on the new electric line which is to run to Barton Heights. It is expected that the road will be in operation in about a week, and a 20 minutes service will be given over the route, which is one and a half miles in length.

The Homestead, Pa., electric light plant was wrecked last week. The casting which formed the bed of the big engine broke and the engine smashed all the machinery to pieces. The engine alone was worth $8,200. It will be a month before the plant is refitted, and the borough will be in darkness in the meantime.

The street railway company in Meriden, Conn., has decided to put in the Thomson-Houston system of electric cars, and work will be begun next week. The majority of the stock of the company has been sold to a Philadelphia syndicate, represented by Walter P. Douglass. Electric cars will be running by December.

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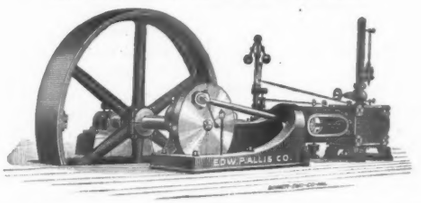

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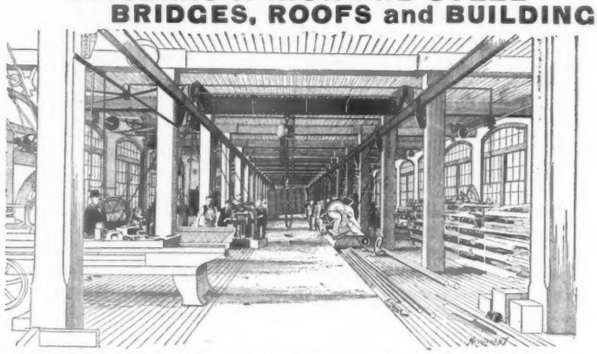

The above illustration is taken direct from a photograph and show the construction of a Traveling Crane placed by us in the Machine Shop of The National Meter Co., at Brooklyn, N. Y. The building is the usual construction of brick walls with wooden posts supporting wooden floors. The Crane girders are attached to wooden posts, and the Crane has a travel the full length of the building between the posts. The plan commends itself where parties desire to control a limited floor space in a building already built.

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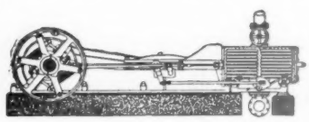

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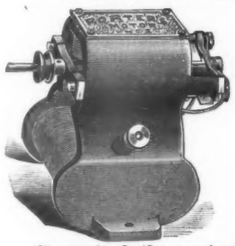

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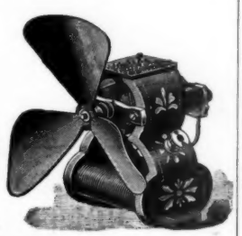

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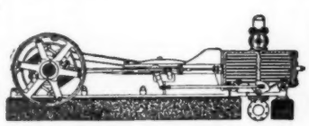

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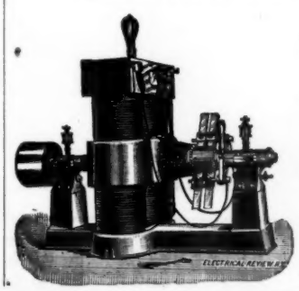

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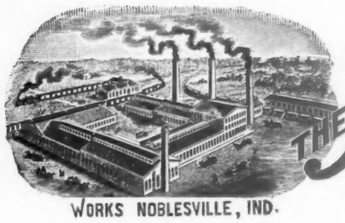

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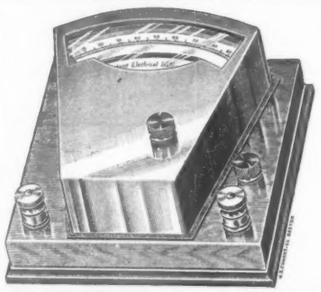

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